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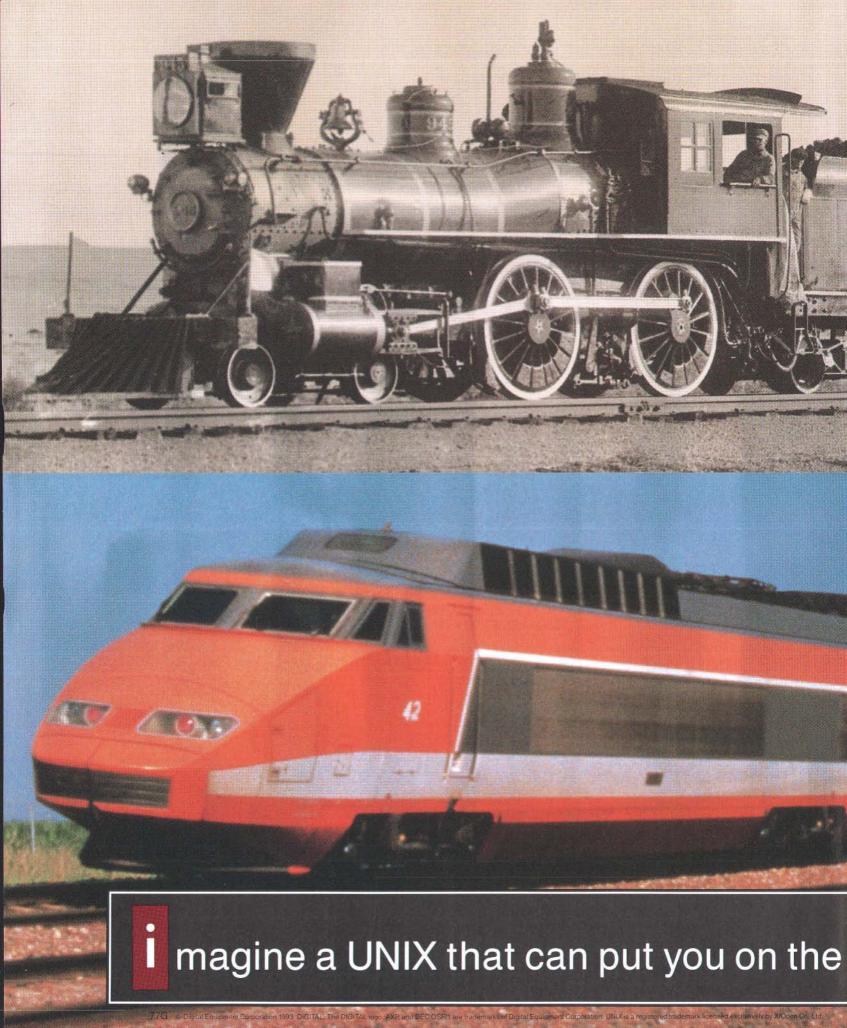


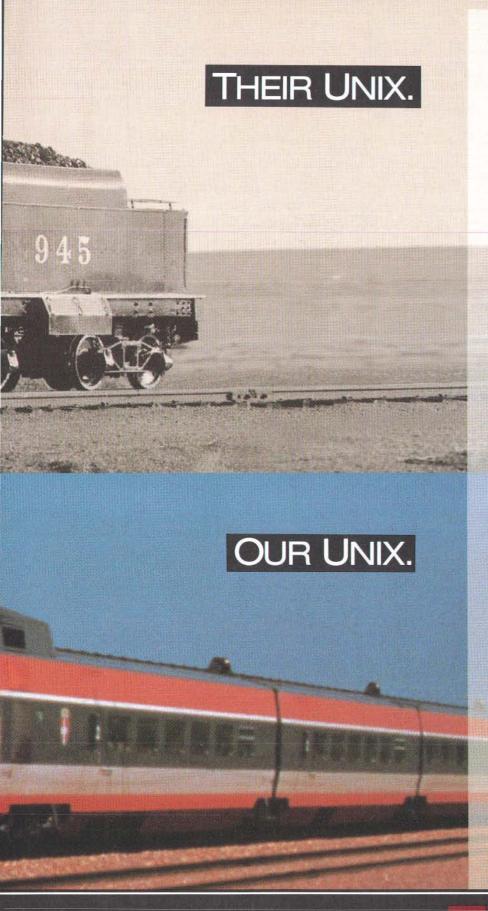
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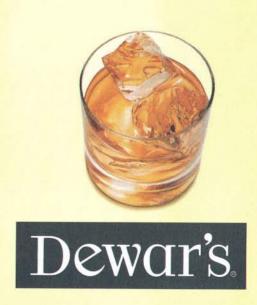
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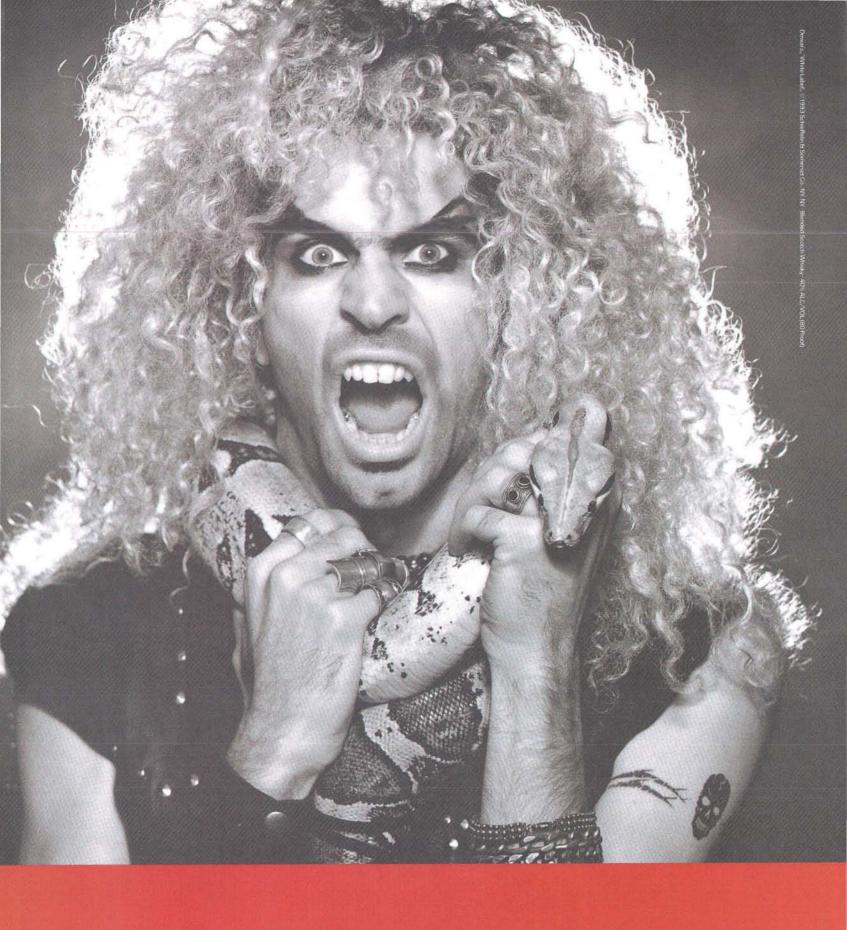
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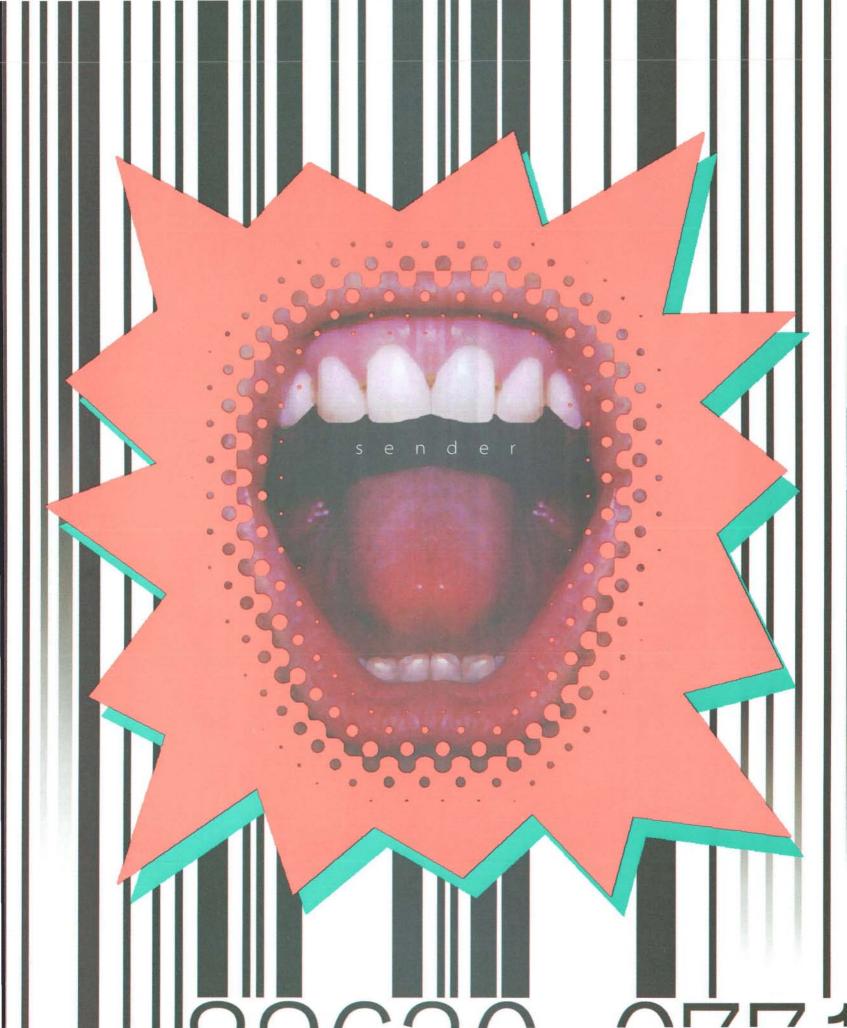
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- Michael Schrage, p71

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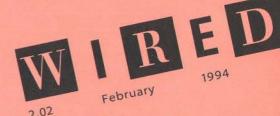
Armed with commercially available technology, a small group of citizens are unmasking the US Defense Department's black-budget aircraft. By Phil Patton



### **Nobody Fucks With the DMV**

The government is using your driver's license to play Big Brother.

A Wired investigation by Simson L. Garfinkel





**Final Fantasy** 

Why Dutch photographer Inez van Lamsweerde is shocking Europe. By Jules Marshall



### PARC Is BACK!

After fumbling the future, Xerox PARC is back with a visionary new director, bright researchers, and amazing new technology. By Howard Rheingold



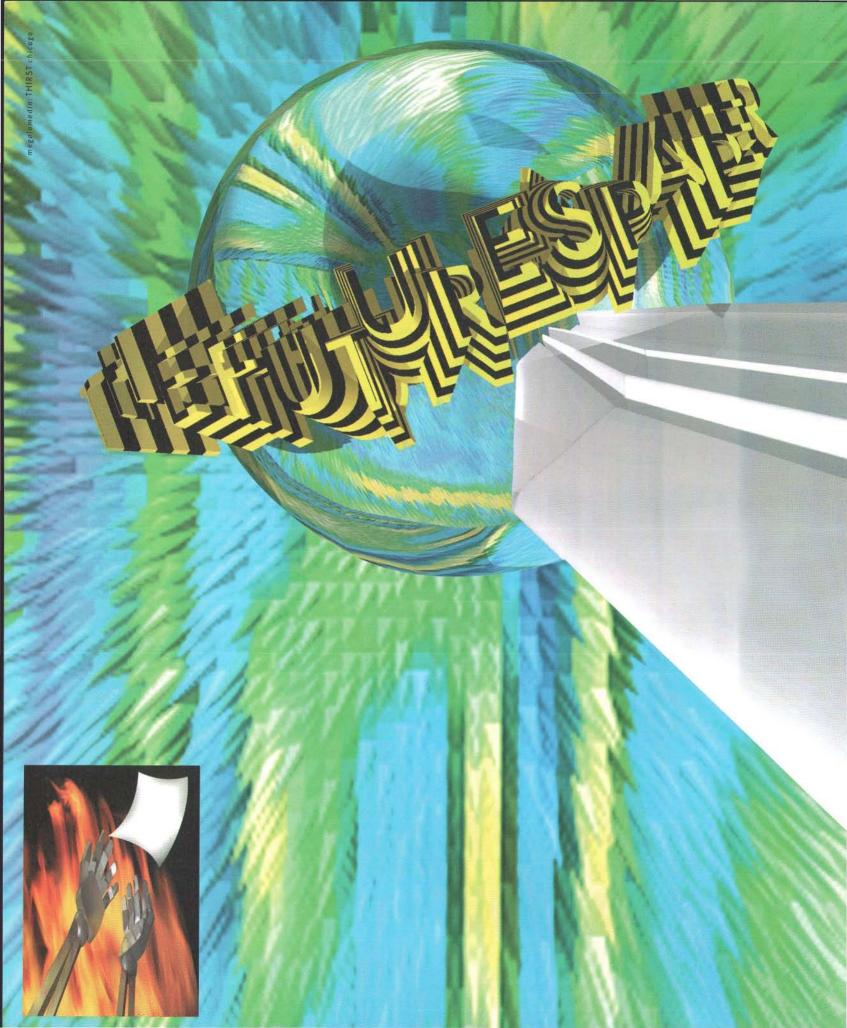
### Street Myths: John C. Dvorak

An occasional insider's look at the digerati, starting with computer journalism's most famous columnist. By Paulina Borsook

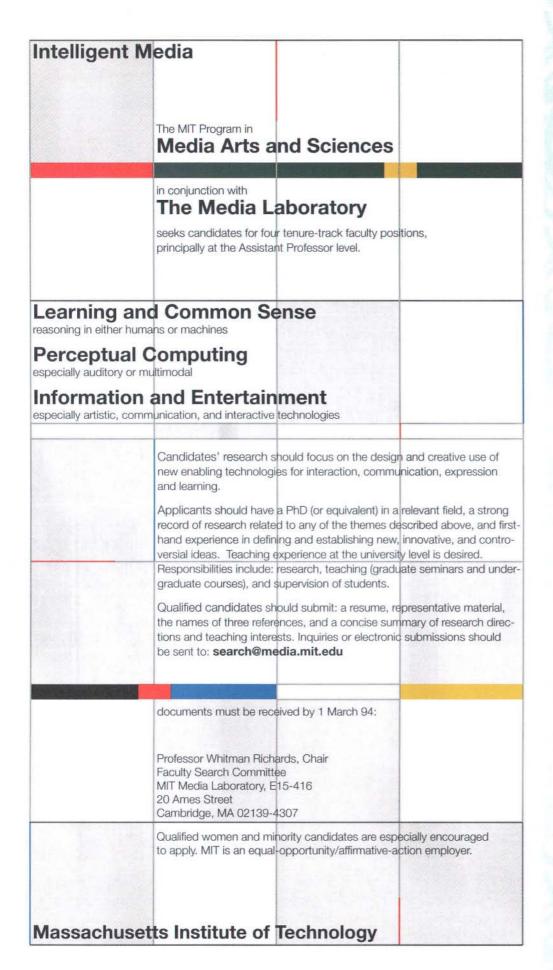


### In the Kingdom of Mao Bell

A billion Chinese are using new technology to create the fastest growing economy on the planet. But while information wants to be free, do they? By Snow Crash's Neal Stephenson









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### RANTS & RAVES

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### Mass Media, Mass Confusion

Michael Crichton confused me with his essay, "The Mediasaurus" (Wired 1.4, page 56). It would go beyond the scope of this short letter to really analyze his arguments, but I would like to make a few comments. Crichton posits that the mass media is an industry whose product is information. That is clearly not the case, as neither Crichton nor any other consumer pays a cent to receive network television or radio. The broadcast networks are funded entirely by advertising revenues, and even the publications that have some cost to informationreceivers, such as The New York Times, take most of their

revenue from advertisers. Mass media is an industry, yes, but its product is mass audiences, which it sells to advertisers.

Lagree with Crichton that the problem for the networks, and to a lesser extent The Times and other general "mainstream" publications, is that their audiences are no longer captive. In addition, the public's tastes are fragmenting or are displaying a previously hidden diversity that could destroy the economy of scale benefits that advertisers and the mass media enjoyed.

A warning to Crichton and other believers in the coming Infotopia -We the People also enjoy these economies of scale because we aren't paying full price for our information. The mass advertisers - not

information addicts - subsidize camera crews and reporters in Somalia, Bosnia, Baghdad, and Waco. The new economic equilibrium of the digital information age will have a lot more negative trade-offs than the true believers anticipate. How many people are going to be willing to pay the true cost of their TV news by the minute, and how many will just stop watching the news at all, driving up the price further for the rest of us and perpetuating American ignorance?

While I don't watch much television, I rather like some of the aspects of existing media. For example, as a financial market speculator, I like the fact that everyone sees today's Wall Street Journal at the same time I do, and we all see the same stories. I like that I don't have to pay to see Melrose Place because I wouldn't. And I love Wired. Enough to post this rebuttal to the argument of the gentleman from Jurassic Park that we cannot "find this kind of debate in today's...magazines." Thereby disproving it. Joshua Adler

Joshua A 104@aol.com

### **Selling Cells**

Joe Flower's article on Iridium (Wired 1.5, page 72) and the dawn of satellite telephones understates the market opportunity. Ten years ago cellular telephone pioneers, for lack of a better number, determined the cellular market to be one million customers by the year 2000. Today there are 20 million users in nearly 70 countries, and all of the companies that sat the fence are paying billions of dollars to get in the game. Satellite telephones are a superior technology to cellular and offer the new "global" workforce the kind of flexibility that it absolutely requires. Once cellular telephones mature

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dents' traditional studies - not as a frill or an add-on or a "gee whiz" special effect - but as a way to reconnect learning with feelings, insights, and real purpose. In this way, as Jacques Leslie suggests (Wired 1.5, page 90), the use of telecommunications helps to spark students' enthusiasm for learning throughout a lifetime. Madeleine Friedman

friedmn@alpha.acast.nova.edu

### **Griping the System**

I'm just your average teenage technophile, angry at the

educational system for its constant ignorance of this everchanging beast we call technology. Kids are learning things that are archaic and old-fashioned and it's just making me mad that I have to spend my own money and the little free time I have to learn about the most important thing on the planet today. Nick Hodulick nhodulick@norden1.com



into a mass-market item, satellite telephones will be right behind them.

Gene S. Bem Lexington, Massachusetts

### A Lifetime of Learning

For years, teachers in the throes of school reform and restructuring have grappled with the idea of "authentic curriculum" - real-time studies that engage students in activities that have significance beyond the confines of classroom and school walls. Telecomputing automatically makes learning authentic. Nothing motivates a student to proofread like the knowledge that a letter is about to be posted for worldwide peer review. Nothing makes geography and world cultures come alive more than when students connect and interact with peers from the countries they are studying. Online networking facilitates collaborative research and adds a global dimension to the concept of community service and social responsibility.

Telecomputing integrates comfortably into the stu-

### What's NeXT

I was puzzled by a piece reviewing the book Steve Jobs and the NeXT Big Thing (Wired 1.6, page 112). The review contains a glaring error: NeXT still exists, and did not fold when it dropped its hardware line. The company is more alive

than ever, selling its OS, which is the best on the planet (I've owned and used Macs, Suns, Silicon Graphics, PCs, and am convinced of NeXTSTEP's superiority.) Misleading reviews such as the one in Wired, which, of all rags, ought to be championing NeXTSTEP as the one company trying to do something against the Microsoft monopoly and the generally rotten interfaces foisted upon users, help kill creativity and make the world a poorer place. If in fact NeXT does fold, it will be, in part, because of falsehoods such as the one perpetuated in your review. Robert de Lucca

robinc@jhunix.hcf.jhu.edu

### Compressed Secrets?

In concluding "My Main Squeeze: Fractal Compression" (Wired 1.5, page 54), Fred Davis writes, "Iterated Systems has obtained a patent on its compression technology, but is currently unwilling to reveal the exact nature of the algorithms (which are trade secrets) used in the process. This means that the technology will only



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advance at whatever rate [Iterated] decides to set." But under long-established patent law, if Iterated has applied for a patent but failed to describe the best mode for practicing the claimed invention in detail - i.e. the algorithms - Iterated's patent is invalid.

To prevent exactly the type of technology blackmail suggested by Davis, the patent law requires a patentee to disclose how to practice the invention in complete detail, so that competitors can design around the invention, and so the public can practice the invention after the patent expires by reading the published patent. Thus, Davis's conclusion suggests three possible realities: 1) Iterated's patent is invalid; 2) Iterated's patent does not cover the "trade secret" algorithms; or 3) the patent has been properly granted but not yet issued (published), so that the algorithms will cease to be trade secrets upon publication. You would do your readers a service to clarify the situation.

Christopher J. Palermo 71344.1712@compuserve.com

Good point. Lots of overzealous protectionists forget that the patent law is specifically designed to provide only limited protection and to also require disclosure. The way that Iterated circumvented these requirements was to reveal only the most fundamental algorithm that is used as the primary building block for its technology. This comparatively simple algorithm is used as the basis for the company's patent claim. A good description of this simple algorithm appears in the November issue of Byte magazine, and was written by a vice president at Iterated. The catch is that the sophisticated algorithms needed to read and write fractally compressed files are secret, thus making the file format proprietary, even though the fundamental algorithm was disclosed for the patent.

Because fractal compression technology is so complicated, and because Iterated has developed both the fundamental and the sophisticated algorithms, they have apparently found a way to have their cake and eat it too. - Fred Davis

### A Brothers Defense

Richard Kadrey's comment in Street Cred: "The Brothers Quay are a couple of American kids living in London...." (Wired 1.6, page 114) is misleading. The brothers moved to England from Pennsylvania in 1969. They are approximately 46 years old. They met their producer, Keith Griffiths, at the Royal College of Art about 23 years ago...longer than many of your readers have been alive. They laboured (English spelling) in relative obscurity for years, supporting their films by animating television commercials, which Stephen Quay calls "a stupid gambit and a pact with the devil."

Please don't paint them as enigmatic twentysomething whiz kids. I would hate some Macweenie to think that what the Quays have achieved is simple, easy, and now available via a \$700 piece of 3-D software and a powerful box.

Simon Egelton simon1961@aol.com

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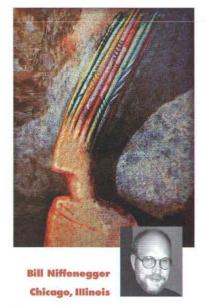
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### Think Globally, Play Locally

Get a clue and go global! Your report "What's In a Game?" (Wired 1.5, page 26) represents the parochial American view of the game console wars, driven by 3DO hype and not reality. The hotbed of console gaming is the UK market, where spotty British adolescents' insatiable gaming habits drive a ferociously competitive market. To find out the real story on the Amiga CD32, check out the Amiga magazine, the UK-published Amiga Format. The September 1993 issue (#50) will set you straight on the CD32's capabilities, and how it compares with the overpriced/ under-powered Sega Mega CD and drive.

Richard J. Akerman Halifax, Nova Scotia, Canada

### Life On the Edge

Regarding Gareth Branwyn's review of The Ecology of Fear, (Wired 1.6, page 114): I, and many others, live on the edge of two worlds. The edge of a coin - a peso. While author Mike Davis depicts a stunning scenario, it is half truth. I am a working class, reformed (appropriately repressed) rebel. I am the person formerly guarded against. I am a family man. I have kids. I have no qualms about becoming a vigilante if my family is harmed. Children are dying at the hands of drive-by gangsters. We cannot sit by the living room window without fear. Some kids just turn up the sound on the TV if the gunfire gets too loud. We have moved three times in an attempt to escape. Therefore, the ecology of fear applies not only to the techno-elite, but to all of us who are random targets. While he may howl at the neofascist tyranny of surveillance, he ignores the need for safety and civilized environments that the rest of us require.

Ricardo E. Gonsalves No Address Given

### **Old Time Religion**

Scott Billups appears to be a union-buster in the Reagan tradition. "The big Hollywood machine is coming down," he says. "The union dance is over" (Wired 1.6, page 60).

In fact, it's been common knowledge in recent years that, by some accounts, 85 percent of production in Hollywood is non-union anyway. On low-budget films, grips and electricians typically work six gruelling 16-hour days a week for as little as \$100 a day, with no benefits when they can find work. Many are trying to raise families on these wages, in a town where, according to Money magazine, a dollar buys only two-thirds of what it buys in, say, Minneapolis.

Roger Corman is a prime suspect, paying people anywhere from nothing to \$50 a day for a chance to break into the business by working on really lousy films. I suppose Billups will be hiring graphic designers on the same basis.

Furthermore, that "fully digitally produced TV show" Billups produced for KCET was in fact a live-action documentary in which the image from a standard video camera was recorded on hard disk instead of on videotape. Big deal.

Billups sounds like a digital version of the old-fashioned Hollywood huckster.

..............................

**Kevin Hanson** Austin, Minnesota

### **Toffler in Huxley Vision**

His vision and ingenuity nothwithstanding, Alvin Toffler (Wired 1.5, page 61) would do well to heed his own advice every so often. He observes correctly, that experts in any particular field, for all their attention to detail indeed because of it - occasionally miss the big picture. So too for Mr. Toffler when he quickly dismisses Huxley as a past genius who miscalculated. Huxley was indeed a genius, but he did not miscalculate.

In his 1946 preface to the fifteenth anniversary edition of Brave New World, Huxley wrote: "...unless we choose to decentralize and to use applied science, not as the end to which human beings are to be made the means, but as the means to producing a race of free individuals, we have only two alternatives to choose from: either a number of national, militarized totalitarianisms, having as their root the terror of the atomic bomb and as their consequence the destruction of civilization (or, if warfare is limited, the perpetuation of militarism); or else one supranational totalitarianism, called into existence by the social chaos resulting from rapid technological progress in general and the atomic in particular, and developing, under the need for efficiency and stability, into the welfare-tyranny of Utopia. You pays your money and you takes your choice," Is not Mr. Toffler, by, for example, advocating supranational treaties like NAFTA for their contributions to long-term stability, simply choosing Huxley's latter option over the former?

Mr. Toffler clearly has much to offer the present age. How much more so, though, if he would focus not upon what he sees that Huxley allegedly did not, but rather upon what Huxley saw that he apparently does not. Roger Raderman

So Hot, So Hot, So Cool...

Berkeley, California

Your magazine is so cool, it superconducts. Justin Wondga jwondga@ersys.edmonton.ab.ca

On page 94 of Wired 1.4, we recommended fingering drink@csh.rit.edu to get to the cola machines at RIT. The correct address is: drink@drink.csh.rit.edu. • In "Art Imitates Life," (Wired 2.01, page 139) we neglected to mention this alternate, less-frequented Go site: telnet flamingo.pasteur.fr 6969.

Send your Rants & Raves to:

Snail mail: Wired, PO Box 191826 San Francisco, CA 94109-9866 E-mail: rants@wired.com



NAKED GUN

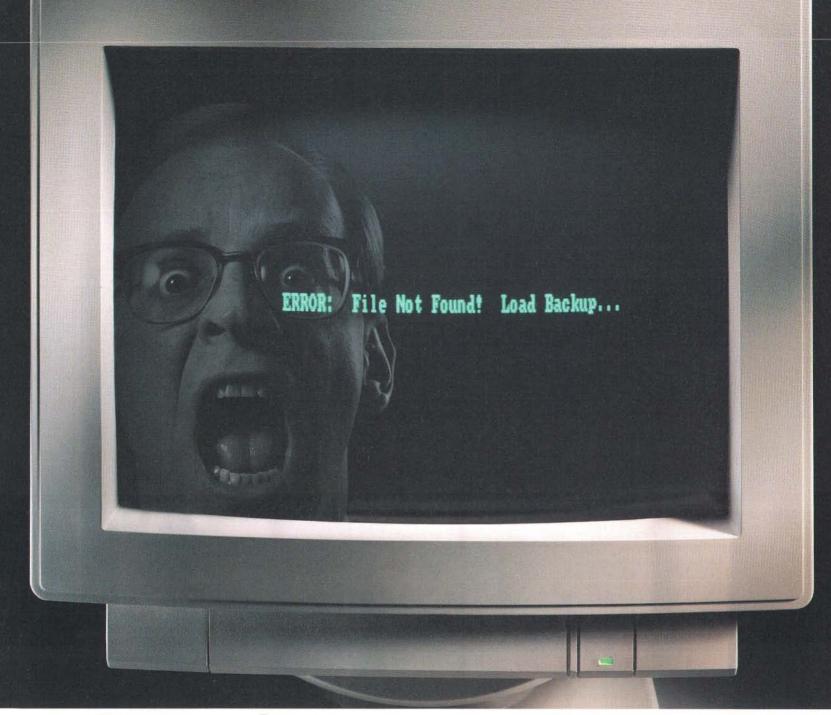
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1 THE FINAL INSULT

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# Richard Saul Wurman: ► TEDologist

When it comes to rubbing brain cells with the well-connected smart set, architect and Information Anxiety author Richard Saul Wurman's TED conference is the happeningest place to be. The theme: Technology, Entertainment, and Design – three things that may have sounded like a strange mix in '84, when Wurman hosted his first TED conference, but now go hand-in-hand. This year's gathering, TED5, opens in Monterey, California, February 24th and runs through the 27th, with seating for a very select 500.

Wurman: "There's no brochure. No poster. No press release." Still, those in the know know about it and passes sell out quickly.

Opening every year with the same line, "Welcome to the dinner party I always wanted to have but couldn't," Wurman thinks the social angle is what makes TED work so well: "You have confidence in the host that the people who are there are interesting." Attendees (a.k.a. "TEDologists") come from all walks of life: doctors, lawyers, artists, authors, scientists, publishers, and a colorful assortment of techies, from software wizards to Disney Imagineers. "There's no niche group," says Wurman. "You usually don't know what the person sitting next to you in the audience does." Then again, some you may recognize. To name-drop a few of TED5's coming attractions, there's director Oliver Stone, author and Harvard zoologist-geologist Stephen Jay Gould, and musician Quincy Jones. (Oh yeah, plus a batch of high-tech heavies like Bill Gates and John Sculley.)

The best part of TED, though, is what goes on between the sessions, during breaks. "Everybody is approachable," says Wurman. "The message to the audience is there isn't Them and Us; the audience is actually more important than the speakers." Make way for some heavy mingling. Introductions are made. Ideas swapped. Deals shaped. A real convergence, at US\$1,450 a pop, excluding lodging and transportation. But look at the fabulous prizes you leave with: one year, Sharp gave away its top-of-the-line Wizard electronic organizer, preloaded with every attendee's contact information. "My goal," says Wurman, "is that the value of the stuff you take away is worth what you paid." (See Deductible Junkets, page 118, for conference details.) Wurman's e-mail address: wurman@medialab.media.mit.edu. - Joe Hutsko



EIII Who's Paying for The Info Highway? You are, right now. Thirty bones a month for standard cable is now considered normal, even though almost all the extra channels you get are supported by the same old advertising base of 30-second commercials. After "installation charges," that's about US\$416 a year for a couple of grunts to staple-gun coax along your floorboards and a programmer to code your ID number into a central accounting computer. So are you willing to pay another \$500 a year for "interactive" services? Well, are you? ≡III We Thought Not: Montreal-based Videoway, the only interactive cable service on the planet not in the test stage (it's got 200,000 subscribers), is coming to the US. Dayton, Ohio, to be specific. Dayton's cable provider, Omnivision, is wisely offering Videoway's services as part of its basic monthly package. ▶

### **Stinking Robots**

Australian engineers have recently taken a cue from nature by giving robots the equivalent of pheromones. Researchers say that enabling robots to mark and detect their own trails using smell will make them cheaper, more efficient, and more flexible.

The idea here is that robots can mimic the behavior of honeybees, which use pheromones to mark flowers they've already visited. They can copy ants too. Ants use pheromones to mark the fastest path for carrying food back to the nest. To transport cargo from A to B, an intelligent robot with expensive sensing equipment would mark a trail that could then be followed by cheaper slave robots.

Most mobile industrial robots only get around because permanent markers in the floor show them the way, restricting them to specially modified environments. More intelligent machines recognize objects and places, but are expensive and difficult to program. Researchers at Griffith University in Brisbane, and Monash University in Clayton, have equipped a mobile robot to spit out, detect, and follow a trail of camphor — an inoffensive material that is easy to detect and vanishes within tens of hours, leaving only a harmless gas.

The camphor gives the robot two new abilities. It can find its way home and it can figure out what territory has already been covered.

Rodney Brooks of MIT's Artificial Intelligence laboratory, known for his work with "robot insects," says this indirect communication between robots is essential. When we start building micro-robots, he says, there won't be space on them for big communications systems. The only communication will be robots sensing others like themselves and markers in the world. – Sunny Bains



or me, using the Net to get information is like wandering through a huge library with the lights out. I blindly grope across the shelves, grab a book that "feels" interesting, and then run outside into the light to see what I've nabbed. More often than not, I'm holding a copy of The 1936 Mineral Deposit Survey of Prichard, Alabama when what I really wanted was a Buzzcocks discography. Even after reading several Inter-

says Wolff. As he and his partners struggled along, Wolff wondered "if there was a way to approach the Net that was organized and familiar. Since I'm not a hacker by any means, what did I relate to?" Not only did all the existing Net books ignore cyberspace's entertaining aspects, but they were process-oriented, not content-oriented. Why hadn't somebody made a TV Guide for the Net? Wolff recognized an opportunity for a new

tainment, business and finance, home, and lifestyles, which are further subdivided into more specific topics, so that *Dr. Who* fans, collectors of old 45s and 78s, female economists, and Boston Bruins fanatics will know where to look on CompuServe, Genie, AOL, the Internet, and hundreds of BBSes. The first 30 pages of *Net Guide* contain how-to instructions, so even net newbies can jump in.

At the time Net Guide went to press,

all the resources listed were active, but

since Net sites as a group don't exactly

have the half-life of plutonium, Wolff &

# net guide..



Romance Connection Provides matchmaking by age, interest, and geographical area. Is your lover out there? ✓ AMERICA ONLINE → keyword ROMANCE



alt.elvis.king (NG) Speculate on Elvis's whereabouts. **VUSENET** 

**Starbase 1** (BBS) *Star Trek* files, role-playing, and messages.



### Finally, a TV Guide for the Net .....

net guide books, I acquired a mere penlight view of cyberspace, when what I really wanted was overhead lights.

Michael Wolff & Company, an independent book publisher/packager in New York City, was also working in the dark while using the Net to gather data for Where We Stand, a book ranking the international community by population, resources, GNPs, etc. "We started using CompuServe, but it became too expensive, so we started using the Internet,"

book, and his group wrote Net Guide.

Wolff's five-person company posted requests for ideas for *Net Guide*, and the online community responded with 100 e-mail messages a day about various jumping-off points for every imaginable interest. "Part of the pleasure of a new discovery is sharing it," says Wolff.

Perhaps the most difficult part was deciding what to cut for the 384 pages of listings. *Net Guide* is divided into main categories such as arts and enter-

Company will be offering an online version of Net Guide (tentatively priced at US\$15 a month), with the newest hangouts in the Net. Net Guide: US\$19. Published by Random House. Michael Wolff & Company (800) 638 1133, +1 (212) 841 1572, e-mail info@go-net-

guide.com. - Mark Frauenfelder

■ ≣III Sex Sells, But Animals Sell Better: In a market where the sale of 4,000 copies is impressive, we were stunned to learn that *The San Diego Zoo...Presents The Animals!*, a CD-ROM version of the world-famous zoo, has sold more than 400,000 copies in the past year or so. ≡III If God Had Intended Us to Use Keyboards: He would have made physical therapy free. For two days in February, at least, advice from therapists is free. The American Physical Therapy Association is staffing a toll-free help line February 3rd and 4th targeted specifically at "victims of the information age." Call (800) 995 7848 to discuss what's ailing you. ≡III Digital Cash: If you live in NYC and bank with Chemical Bank, you can soon join the e-money revolution. Chemical Bank recently announced it would test "intelligent" debit cards which, once fueled with digital cash from your friendly ATM, would be accepted as cash by participating merchants. No more tension-filled moments while you're "waiting for approval." ≡III There Are No Borders in the Sky: Rupert Murdoch, the

### Satellite



















Busting high-seas fish poachers is nearly impossible. The National Marine Fisheries Service has only one patrol vessel and one airplane to scour more than 1 million square miles of ocean. Scoffing at this feeble resistance, poachers often creep into off-limits waters and haul up tons of forbidden salmon and carelessly kill untold numbers of rare marine mammals. Although driftnet ships must carry transponders to enable satellites to monitor their positions, many pirate poachers refuse.

In hopes of detecting such activity, scientists at Natural Resources Consultants, a Seattle firm that advises governments and fishermen, have launched a joint venture with satellite imaging experts at Western Resource Analysis.

They hope to develop a system to track vessel movements by tracing and analyzing exhaust plumes from their engines, possibly to determine whether boats are towing nets or just traveling through. "That's the essence of why we believe this system is useful," says NRC's Mark Freeberg. "It doesn't just work with the good guys."

Scientists reckon the oceans can sustain harvests of about 100 million metric tons of seafood annually. But recently revised estimates suggest that total catches may already exceed that mark, perhaps by as much as 50 percent, when the inadvertent "bycatch" of nontarget species is included. Satellite surveillance may be the only affordable way to keep the poachers in line. — Brad Warren



within MTV's Liquid Television, and sever- moral fiber to the star of Luc Besson's film and Butt-head: visually fluid and full of surrealistic imagery. Foremost among these is the story of a svelte, psychosexual, sci-fi assassin – Aeon Flux. Aeon (rhymes with peon) Flux is the creation of evil. The heroes do not resonate with mation for Colossal Pictures, the film company that produces Liquid Television. an angular science fiction setting in which cast a half-naked covergirl as his action hero? "I'm interested in exploiting the entire human body for expressive purposes, instead of what you usually see in cartoons: just the hands and facial expressions. When I first designed Aeon Flux, I wondered whether I should make her less sexy looking – give her a costume that was less revealing. But it seems silly to be working in the animation medium and not be a little unrealistic. The fact that she's scantily clad helps to empha-Physicality is a large part of Aeon Flux.

Peter

La Femme Nikita: Because she's a visual knockout, you are duped into believing her actions have justifications and are not simply brutal killings. There are no cleverly placed actors to distinguish good from righteousness, the villains do not wheeze a lot of blood is spilled. Another quirk that makes this violently brilliant animation stand out is the fact that Aeon Flux dies in several episodes. This plot development came rather unexpectedly: "After the first season," explains Chung, "I killed her off, not knowing that there was ever going to be a second season. When I was asked to work on a second season, instead of explaining that she really didn't die, or size the expressive qualities of the human Aeon Flux won't be in the next (third) that she was a robot, I decided that dying season of Liquid Television but it is being pitched as a half-hour show for MTV.



### Gobs and Glory

right, modeling clay, of the "Oh Nooo Mr. Bill" variety.

"Everybody is serious with Mortal and Street Fighter," says Greg
Thomas, president of Marin, California-based Visual Concepts, the video game producer responsible for Clay Fighter. "We wanted to add something new to the genre and make it funny." His medium: clay. To come up with the gooey claymation characters, Thomas took his idea to stop-motion animation gurus Ken Pontac and David Bleiman, of Dan-

ger Productions in Brisbane, California (which is currently developing a new, stop-motion animated Saturday morning kid's show, *Bump* in the Night, that will air on ABC television next fall).

The painstaking, shape-andshoot process of creating and animating the claysters took nearly a year. Interplay Productions joined in on the fun by splicing together certain animated sequences to create new moves, and by creating a voice-enhanced musical score and splat-happy sound effects. At Visual Concepts, programmer Jason Anderson put in a year's worth of 18-hour days to turn the raw clay animations into a smooth-flowing, ass-kicking-fun fighting game, which cheerfully boasts flying chunks of colorful clay instead of virtual viscera.

For sure, Clay Fighter is gobs and gobs of good clean fun. Parents will approve, and may even slap a few clay heads themselves. Interplay Productions: (800) 969 4263, +1 (714) 553 6678. – Joe Hutsko



### TIRED

Crime
Interactive TV tests
Welfare Client
Windows NT
Senators
Connie Chung
Gangsta Rap
14,400 bps
Contact Lenses
Scientific American
Manhattan
Wires
Tolerance
Spy



### WIRED

Punishment
Working Worldwide Web Site
Undeserving Poor
Open Step
Mayors
Charlie Rose
Ambient
V.fast
RK Surgery
Nature
Staten Island
Wireless
Acceptance
rec.humor.funny

West's unofficial ambassador to China, is not well-liked by that country's Politboro. His Star TV is seen in an estimated 4.5 million

Chinese homes, and is one of the prime movers behind the satellite dish explosion there (an estimated 500,000 at last count,

according to The New York Times). China has yet to move on its latest threat to tear those half-million dishes from roofs of apartment

buildings everywhere, probably because they'd have no idea what to do with the 5-foot-wide beasts. Not to worry, by the time the Thought Police crash through the doors, the Hughes Directty folks will have flooded the country with 18-inch satellite dishes. If the company has any sense, it'll market them as a combination TV receiver/wok. That'll fool 'em. 

Ill It's Starting, If Slowly: Late last year Davidson & Associates (see page 44) and McMillan/McGraw-Hill announced an alliance to develop online, interactive curricu-

la. ≡III Is This Your Boss? A recent Robert Half International study found that more than half of top executives in the US and UK are

### The Ecology of Economics .....

At 41, Michael Rothschild is a jack-ofall-trades wunderkind. Though he earned his law and MBA degrees simultaneously from Harvard, Rothschild's claim to fame is his work in another field – economics.

Working as a business consultant, Rothschild was struck by the contrast between economic theory and economic practice. In business he saw a chaotic, self-organizing information system that was more biological than mechanical. He found that business organizations, like living organizations, adapt, grow, die – and learn.

Organizational learning then, according to Rothschild, is the economic equivalent of evolution. It is also the linchpin of his "bionomics."

The most important difference between organizational learning and biological evolution is pace. Economic progress has always been millions of times faster than biological progress. And according to Rothschild, you ain't seen nothing yet.

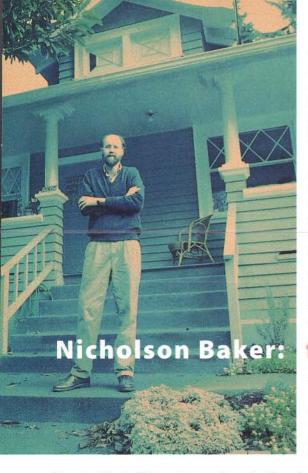
Organizational learning depends on a uniquely human skill: the ability to use what Rothschild calls "coded information." This is his shorthand for symbolic representations of information such as written language, blueprints, maps, etc.

As the information economy accel-

erates exponentially, the validity of Rothschild's bionomics will become evident. Because of ceaseless economic evolution, in the form of accumulated production experience, the cost of goods falls. Forever. Historically, this facet of free market economies has been masked by inflation. Now, even runaway inflation will be hard pressed to keep up with the falling prices that will result from the Digital Information Explosion.

Don Lavoie, associate professor of economics and chair of the Program on Social and Organizational Learning at George Mason University, says, "Michael Rothschild's contribution is rethinking economics as an information ecosystem – an evolving system for the discovery and conveyance of knowledge. Others, most notably Friedrich Hayek, have used biological evolution as a model and stressed the biological aspects of market processes. Rothschild goes beyond this, by drawing from a diverse range of detailed biological examples."

The Bionomics Institute, created by Rothschild in 1991, offers conferences, seminars, consultations, and publications. The Bionomics Institute: +1 (415) 454 1000, +1 (415) 454 7460, e-mail bionomix@well.sf.ca.us. - Sandy Sandfort



normal, shy man who writes books about perfectly normal, shy man who writes books about perfectly normal, shy men who have universes exploding in their minds. He lives in a nice quiet suburb. He has a tiny new baby. And his new book, *The Fermata*, is shocking.

Baker's first novel, *The Mezzanine*, was a phenomenal recording of the wanderings of the idle mind, a book that did for antiperspirant, olive loaf, and perforation what *The Brothers Karamazov* did for faith, despair, and murder.

Baker's last novel, Vox, caused a stir in the publishing world with its simple yet devastating structure: The entire book consists of the conversation between a man and a woman engaged checks out what's under the dress of that little number with the cute haircut.

"The easy thing to do would be to make this a nice story, in which the guy does all sorts of gently philanthropic things," Baker says. "But if you really think about it, if you had this ability, would you right all the wrongs of the world, or would you engage in some subversive experimentation first?"

Arno chooses the latter. Baker takes Arno, and us, to ridiculous extremes in search of the perfect Strinean sexual experience. He hides in women's hampers and watches them masturbate. He freezes women in time and snoops into their lives, looking for clues in their diaries or their underwear drawers that he can later use to make himself

they happen. "Writing always feels a little like you are suspending the universe and creating a separate sphere of reflection," Baker says. "But Arno is able to take it a little further. He can be right in the middle of doing something voyeuristic, say, and be quietly thinking it over at the same time. He can be there and not there. In fact, while I was writing the book, the premise took hold of me, and I really started to expect that there would be a time when time-perversion would be possible."

If that sounds a lot like the vague, bodiless worlds of VR and the Net, Baker, onetime technical writer, acknowledges the debt. "The book is trying to do something similar to VR, as all novels are, but more embedded in the real world," he says. "I want imperfection, not complete control."

The Fermata is so weird, so extremely dirty, so funny, on such knowing terms with pornography, and above all, so well written, that no one will be able to ignore it. US\$21. Random House: (800) 733 3000, +1 (212) 751 2600 – Robert Rossney

### from Vox to The Fermata

in pay-per-minute phone sex.

Baker's new novel, *The Fermata*, concerns Arno Strine, who can stop time at will. As he wanders about in the frozen universe, he does what he thinks any quy, given his powers, would do. He

irresistable to them.

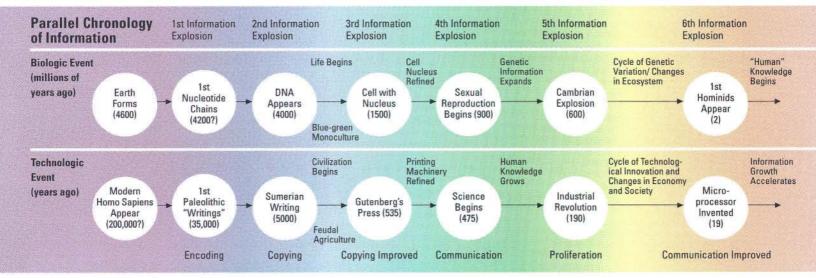
What truly motivated Baker to write The Fermata? Indulging his and most every writer's most unattainable fantasy: observing, participating in, and recording events in the real world as

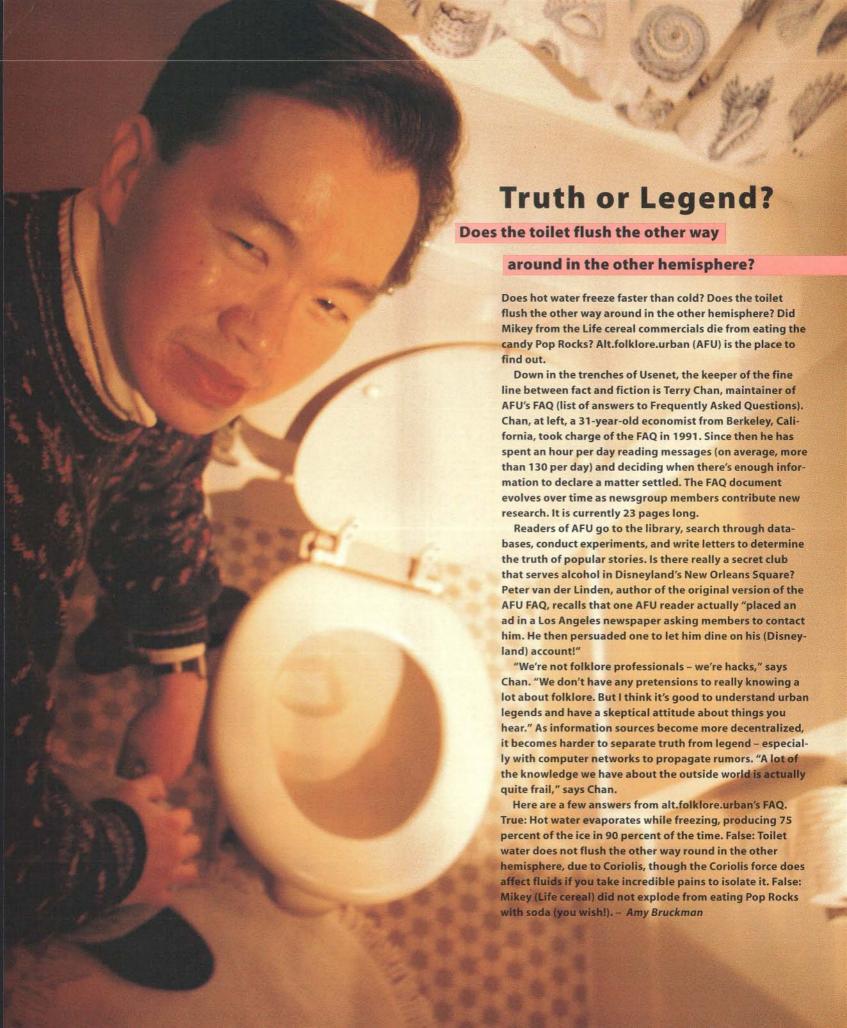
"computer illiterate." With any luck, soon "computer literacy" won't be an issue at all, even for your boss.  $\equiv$ III Stupid Microwave Tricks: Descriptions of this neat multiuser, interactive game have been cruising the Net lately: Lightly grease your microwave with sunflower oil. Position as many grapes as there are players on one side of the oven, stem side facing the wall. Close the door, hit Start, and place your bets as the grapes, thanks to the physics of heat transfer, skate across the hot oil. As with Formula One racing, the best part is when the cars explode.  $\equiv$ III Speaking of Unfriendly Skies: According to a Reuters report,

that other bastion of democracy and free speech, Kuwait, is considering jamming satellite channels that do not "conform with the traditions and religious values of society." 

Ill Nothing Like a Good Read: Bookstore revenues increased 6.7 percent in the first nine months of 1993, according to a recent industry report. Not to be outdone, Sony's Digital Audio Disc Corp. (DADC), in Terre Haute, Indiana announced the pressing of its 50 millionth CD-ROM late last year. 

Ill Ma Sell: Five major cable companies, TCI, Time Warner, and Cox among them, announced last December the creation of Teleport Communications Group, which will "compete head-to-head with regional phone companies." That's competition?





### JARGON WATCH

**BLOB** (Binary Large OBject) — Used to describe very large binary files. "The speed of your server is a function of the size and number of BLOBs you'll be moving through the network."

**Dawn Patrol** – Programmers who are still at their terminals when you return to work the next morning.

Dittoheads – People who are in perfect alignment on an issue, an idea, or a belief system. Allegedly coined by Rush Limbaugh to refer to his legion of faithful followers.

Firefighters – Net users who try to put out "flame wars" early in their gestation.

**Going Postal** – Euphemism for being totally stressed out; losing it. Makes reference to the unfortunate number of postal employees who have snapped and gone on mass shooting rampages.

Holy Wars – Perpetual BBS discussions that never die, the arguments never change, and no one's opinions ever budge one iota. Holy wars are fought over abortion, gun control, Mac versus IBM, Windows versus DOS, and how much nudity to allow in the image areas of online services.

**Slag** – To bring a network, especially a LAN, to its knees by overloading it with data traffic. "We slagged the net last night by playing *Spectre* while the MIS department was trying to reindex the accounting file."

**SoHo** – Acronym for Small Office, Home Office. Ziff-Davis recently started inserting a PC supplement into Sunday newspapers targeting the SoHo market. **Thrashing** – Clicking helter skelter around an interactive computer screen in search of hidden buttons that might trigger actions. (Found in the manual to the CD-ROM game Myst.) – Gareth Branwyn

Tip o' the hat to: John Raymond Sumser, Ian Iver, Eric S. Theise, John Manning, and Rebecca Lartigue

Understand: A New Jersey man, arrested after pumping several rounds of lead into his misbehaving home computer, told police he "couldn't understand why he couldn't shoot his own computer in his own home." Unfortunately he used hollow-point bullets and the gun was not registered. As an alternative, we suggest a screen saver which, on your command, turns your monitor into a gutted hulk. 

Ill The Revolution Just Got Faster: Not content to let the PowerPC eat its lunch, Intel recently announced that its entire line of chips will double in speed over the next year – without a price increase. 

Ill Reinventing Silicon Valley: Bored with forging the computer revolution, a non-profit consortium of Silicon Valley companies has garnered a major grant from state and federal agencies to create CommerceNet, an \$8 million project "designed to help Silicon Valley businesses make commercial use of the coming 'Information Superhighway.'" Sponsored by Smart Valley Inc. – the consortium of Valley biggies – and the private

consulting firm EIT (e-mail ams@eit.com), CommerceNet could be seen as the first serious attempt to turn the Net into a viable commercial infrastructure. 

If you think the All-Music Guide is a good idea (see page 52), how about an Internet Encyclopedia? The Interpedia, as it will be known, is under construction by infonauts around the globe. It began as a mailing list, but its goal is the creation of a living document that will be kept completely up-to-date. Indeed, it may include hypertext links to ongoing discussions, and perhaps evolve into a general interface to all resources and activities on the Internet." Interested? E-mail

Sexonix, the world's first VR sex company, has lots of appeal. They manufacture and sell specialized software and hardware to bring about the ultimate in safe sex and digital convergence. Just one thing

expressing outrage and cries of foul play.

All well and good, except the gear never existed, and he never had anything to show. The whole stunt was done with a few well-chosen video clips by online denizens, and one counter-prankster posted that Skaggs had died of mysterious circumstances. Needless to say, Skaggs is alive and well and quite amused by the attention.

### The Sexonix B U S T

keeps it out of the hands and off the genitals of eager teledildonauts: The company is a hoax from start to finish, masterminded by Joey Skaggs, a professional media performance artist.

Sexonix got its "start" at the Toronto Christmas Gift Show in the fall of 1992, when Skaggs rented a booth at the show and called a press conference to demonstrate his wares to reporters. But Skaggs's booth was empty – he claimed all of his VR gear was confiscated by Canadian customs for obscenity reasons, putting Sexonix out of business.

The confiscation story was covered on television, radio, and newspapers in Toronto, and picked up by wire services around the world. Future Sex and New Media magazines covered Sexonix's plight,

from *Lawnmower Man*, some actors, and help from a public relations agency to stir up press interest.

Skaggs wasn't satisfied with just duping the media: He went after the online community as well. In July 1993, months after the initial wave of publicity surrounding Sexonix, he posted a press release describing the "events" surrounding his Toronto confiscation and the demise of Sexonix on several BBSes, including ECHO, Fidonet, and the Well. His posting stimulated discussions that were active over the summer, and he still gets queries once in a while. Most Wellites fell for the scam — except for journalist Brock Meeks, who smelled a rat and checked the facts.

Once exposed on the Well, Skaggs was vilified

This isn't Skaggs's first hoax. Previously he played a doctor with a cockroach-extract-based cure for arthritis, acne, and radiation sickness; a proprietor of a dog bordello; and the founder of the Fat Squad – guards for fat people to keep them from overeating.

Seeing how easily the Sexonix hoax went over on the Net, where everybody is both a reporter and a reader, Skaggs's media pranks are a reminder to check the source before reposting the story.

- David Strom



## WIREDTOPIO

Ten most populated chat rooms created by members of AOL:

- 1. women4women
- 2. Intelligent Intimacy
- 3. men4men
- 4. Swingers or Group
- 5. Le Chateau
- 6. Men Who Want 2 Meet Men
- 7. Naughty Wives
- 8. Young Men4Men
- 9. Forty Something
- 10. Need Female for Adult Films

Captured at 11:00 p.m., Friday, December 4, 1993. Similarly named rooms, filled to capacity, were witnessed on other nights.



Family Values: From Cowpokes to Cartridges



interpedia-request@telerama.lm.com with the body of the message containing the word 'subscribe' and your e-mail address, as follows: subscribe your\_username@your.

host.domain. \(\sim \) III Support Apple: Apple is under attack for its policy supporting gay rights in the workplace. Thanks to the hate-mongering-but-organized religious right,

Apple's anti-gay mail outnumbers supporting mail 500 to 1. Change the odds: e-mail Keith Sullivan, Human Resources Director, at sullivan6@applelink.apple.com. \(\sim \) III The

Ultimate TV Tan: Samsung claims to have invented a TV that converts harmful emissions into infrared rays which, simulating sunlight, actually stimulate growth in plants
and animals. Lab tests prove that flowers stay fresher, fish are more active, and tadpoles live twice as long. Just think what it'll do for the average American child! \(\sim \) III

### **Broadcast Quality From the Desktop**



"Broadcast quality!" That's the claim, but most desktop digital video systems output 30 frames per second – but not the 60 fields per second that broadcast-quality video requires. Producers who use the Mac for video post-production must rent time on D1 edit bays to make material ready for prime time.

Now Radius of San Jose, California is offering a solution: the VideoVision Studio, which allows Adobe Premiere to output full-screen, 60-fields-per-second broadcast quality video.

At 1993's Digital World, broadcast designers Flavio Kampah and David Sparrgrove saw a demonstration of Radius's at-that-time-unreleased Video-Vision. Kampah, who had already become a convert when he used a desktop system as an editing tool on a music video for U2, wanted to create their next project – the introduction to the lowbrow TV show American Gladiators – entirely on the Mac. The designers convinced the Radius honchos to let them be the board's first users. And the result was a first in broadcast design history: The colorful bursts of fast moving images and textured graphics from the American Gladiators opening came straight off the desktop.

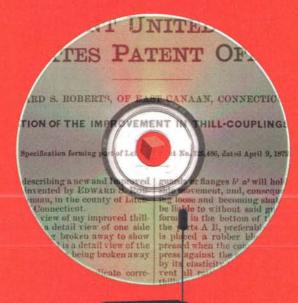
Sparrgrove raves about the new board: "We didn't need to surrender control. We could continue to design while we produced." Radius: +1 (408) 434 1010. – Debra Kaufman

### Cellular Hybrid

The PDA meets the cell phone in the form of Simon, a handheld device developed by IBM and sold by BellSouth Cellular. Simon features a cellular telephone with wireless messaging, paging, and two-way fax capabilities. Weighing in at under one pound, Simon sports a graphical user interface developed by IBM, includes a scheduler, a pen-based notepad, and cc:Mail client software. Simon also contains a PCMCIA slot, so to receive and display pages, you'll need to buy and insert a PCMCIA card. Less than US\$1,000. (800) 746 6672, +1 (404) 604 6493.

### Never Get Up Again

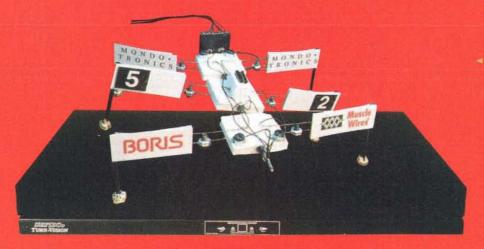
If you subject yourself to long periods of daytime TV watching, you probably have lots of problems. One of them is that the sun glares across the screen as it moves across the sky during the day. It's hard to move the sun, so you have to move the screen. As if couch potatoes aren't lazy enough already, now there's one less reason to get up from your seat. The Turn Vision is a motorized swivel stand for your TV that lets you use almost any remote control unit to turn your TV to the proper viewing angle. Available for 13- to 35inch sets, its drive mechanism automatically turns off if it bumps up against something or someone while turning. US\$195. +1 (619) 944 9900. fax +1 (619) 944 1260.



F E T

S H

### Edited by Frederic E. Davis



### 

You've got a great idea. You think it might be patentable. You could trudge over to a patent library, but that's way too time-consuming. You could do an online search, but that's pricey at 50 to 100 bucks a pop. If you're an idea factory, or interested in some of the best info-surfing available, you'll want Patent Scan Plus, a set of ten CD-ROMs with information on almost two million patent records spanning the past twenty years. This may well be the most significant body of information ever published in electronic format. US\$5.000. +1 (617) 576 5747.

### Muscle Wires

Inventors, hackers, and project freaks take note, Muscle Wires are in. When you apply electricity, Muscle Wires can move things without a motor. Muscle Wires are actually strands and springs composed of a special nickeltitanium alloy called nitinol, which changes its shape in response to differences in temperature. A small electric current causes Muscle Wires to heat and shrink. Turn off the current, and they expand. You can use them for just about anything, from making silent fans to lightweight, motorless walking robots. The project book includes instructions and ideas for everything from computer-controlled systems to movie effects. You can order a project book and hobbyist kit for US\$59.95, or an R&D lab pack for US\$249. (800) 374 5764, +1 (415) 455 9330.

### Wired Workstation

Buying a high-powered multimedia workstation piece-bypiece can cost a bundle. When SGI introduced the \$5,000 Indy, people jumped up and down with joy until they realized that they'd have to kick in another grand for a hard drive and at least \$2,000 for a capture/compression card. But now there really is a fullyconfigured \$5,000 multimedia workstation, and it comes from no less a contender than Sun Microsystems. The SPARCclassic M system includes 16 Mbyte RAM, a 15inch color monitor, 200-Mbyte hard drive, CD-ROM drive, video camera, and real-time video capture/compression card, so you can conference over standard networks. And now that Adohe has a version of Photoshop for SPARCstations, people can start jumping up and down again. +1 (415) 336 0979.

### No More TV Warp

If you move a powerful magnet over a television or computer screen, the image will distort hideously. I used to love doing that in science class, but it's not too great for my TV set or computer. I also happen to love music and like to have a set of nice speakers for both my TV and computer. But guess what's inside nice speakers? Powerful magnets that can really muck up a screen. B&W has come to the rescue with its 2000 series of loudspeakers, which offer the new zero magnetic field (ZMF) design. This technology eliminates image distortion on TVs and monitors no matter how close speakers are placed to the screen. They also sound areat, thanks to a new baffle design that emerged from a massive CAD project at BMW. US\$199-\$549 per pair. (800) 370 3740. +1 (508) 664 2870.



### 3-Pound Road Warrior

Portable computers are never portable enough. And if they are portable, they aren't powerful enough. Although it's not perfect, the best compromise so far is the OmniBook 425 from Hewlett-Packard, The 425, HP's newest portable (see Wired 1.5, page 100 for review of 386-based OmniBook 300) has a 25-MHz 486 chip, which provides the punch for this almost pocket-sized system that weighs a mere 2.9 pounds and runs on four AA batteries. It includes a full-sized keyboard (!) and a clever pop-out mouse.

Another amazing feature is that Word for Windows and Excel are built into ROM – just press a button and everything springs to life. US\$2,125 with 40-Mbyte hard disk. (800) 443 1254, +1 (408) 738 8858.

### ◀ Beyond Air Guitar

What a funky-looking guitar! Oh, it's not a guitar. It's The Key - a new "interactive multimedia musical instrument," that folks with no musical chops can just pick up and start playing. The neck of The Key is actually a keyboard, and the body contains six "strummer veins" instead of strings. Strum it and The Key fills in the chords and makes you sound great. Even cooler is the ability to plug The Key into a standard VCR and use encoded music videos so you can play along with your favorite bands (CD-ROM and CD-I capabilities are in the works). The Key has a MIDI output for connecting to a sequencer. You'll have to wait a month or two for The Key to hit the stores, though, before you can kick out the jams. US\$300-\$400. +1 (516) 939 6116.



#### Sound Effects

Want to sound like Darth Vader or maybe Alvin the Chipmunk? Or take a sound signal and place it into the depths of a cathedral or the bathroom shower? You can do all that and lots more if you equip your recording studio with the way cool DP/4 parallel effects processor from the electronic music wizards at Ensonia. This little black box contains four of Ensoniq's custom DSP chips - each one provides a separate channel of 24-bit audio effects. These chips enable you to do four different things to one sound signal, or one thing to four different sound signals, or anything inbetween. The box comes loaded with 46 basic effects and 400 preset programs. You can program your own if you don't mind a lot of kludgey button pressing and dial tuning, US\$1,495. (800) 553 5151, +1 (215) 647 3930.

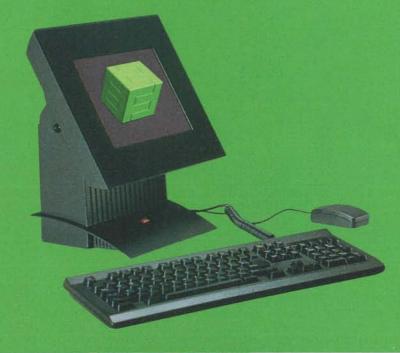
#### Consolidate Your Zappers

Americans own almost 300 million handheld remote control units. That's more remotes in the US than people. Sure, some people don't have remotes, but then there are people like me with more than a dozen. The VCRPRO 4 is a universal remote control for TV sets, VCRs, cable TV converters, CD players, and other such devices. Not only does this cut down on clutter, it's also a good solution for that lost or broken remote control unit. And it simplifies recording programs, because it can control both the cable channel and the record functions of the VCR. US\$79.99. +1 (216) 487 1110.









#### A Local Color

Most color printers suck. Although 24-bit color scanners, display cards, and image software will let you scan in and play with photorealistic images, your creative talent will emerge from a laser printer or color inkjet printer looking terrible. The only way to get good color output is to use a dyesublimation printer, which impregnates the paper with exact mixtures of primary colors to create printouts that look like photographs. The Proof Positive printer from SuperMac works with SuperMac's line of color display technology to yield such a high degree of color accuracy that it can be used as a color proofing system for professional publishing. Better yet, artists and photographers now have the means to produce highquality output. US\$8,995. +1 (408) 541 6100.

#### Slick Green Machine

It's small. It's sleek. It's cool. And it's environmentfriendly. It's the APF4000 personal computer. Someday, all computers will look more like this - a tiny footprint on your desk and a flat panel color display. If you want the future today, you'll have to shell out a hefty \$7K for this 66-MHz 486 with 32 Mbytes of RAM and a 10.4-inch flat panel screen, which can display photorealistic images. It qualifies for the EPA's Energy Star Pollution Preventer system, consuming less than 40 watts of energy. The flat panel color screen emits no radiation or EMI. And there's no fan, so you don't have to listen to that vacuum-cleaner sound that plagues many PCs. U5\$6,995.

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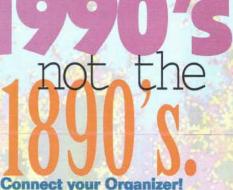
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## **Wiring Japan**



## In the first of an exclusive two-part series, Bob Johnstone reports from Tokyo on the bitter culture clash that has reduced Japan to a third-rate power in networking.

A t precisely 8:00 on the evening of Friday, September 17, 1993, Japan's first commercial Internet packets flashed out of Tokyo and down Trans-Pacific Cable No. 4, bound for San Jose, California. A new era in Japanese networking had begun. As befits the birth of a new business, cheers went up and toasts were made. But not everybody was rejoicing in Tokyo that night – for Japan's first com-

On one side of the clash is "Internet samurai" Jun Murai – founder of the backbone network, WIDE, and thorn in the side of Japanese Ministry officials.

packets were sent by American engineers working for Japanese subsidiaries of the US corporations InterCon Systems and AT&T. InterCon's first customer was TWICS, Japan's first public access Internet provider, a small for-profit firm most of whose 400-odd subscribers are foreigners based in Japan. Across town.

mercial Internet

a group of Japanese Internet pioneers were grinding their teeth in frustration. The company they had set up to provide commercial Internet services had been denied a license to operate by Japan's Ministry of Posts and Telecommunications. Holding up the locals while waving on the foreigners is not the way business is usually done in Japan. Something odd is going on.

That something, in essence, is the head-on collision of two cultures: The freewheeling, democratic style of the Internet has run smack into traditional Japan at its most authoritarian. On one side, you have the technology pioneers, young volunteers who built Japan's largest research network by their own efforts, without any support from the Japanese government. They are led by Jun Murai, the man some Americans (like Carl Malamud and Howard Rheingold) call the Internet samurai.

On the other, you have the officials charged with providing network services to the Japanese research community. They have tried to ram unpopular standards and technology down users' throats – and failed. Their leader is Hiroshi Inose, arguably Japan's most powerful technocrat.

The officials resent the pioneers' early successes and are waging a dirty-tricks campaign to try to regain the upper hand. Through their arrogant behavior, the pioneers have played into hands of their rivals, who are masters of the bureaucratic game.

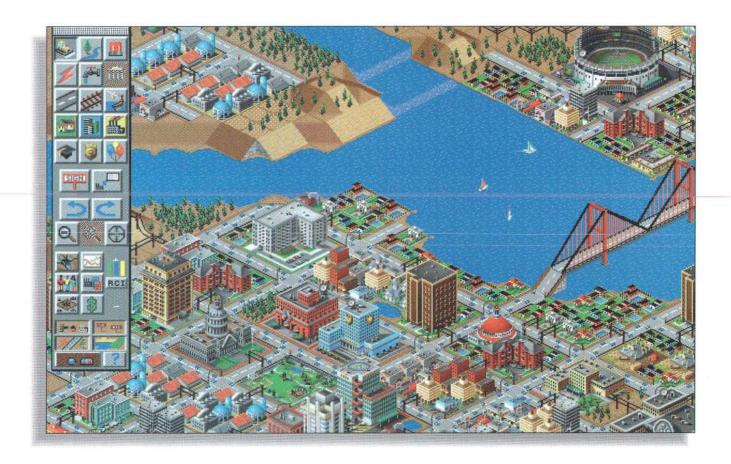
Today, the situation has degenerated into a highly emotional conflict, with each side hurling accusations and insults at the other. Little TWICS has been caught in the crossfire. In mid November, the company's long-standing domestic e-mail connection via Tokyo University was suddenly cut off, apparently in retaliation for TWICS having opted to use a non-Japanese Internet link. Then the company received an intimidating phone call from a man claiming to represent the computer center at Tokyo University.

"Stop doing business in Japan!" the man shouted, "Shut down at once!" (TWICS has since been reconnected.) "It's one of the trickiest messes I've seen in years," comments Internet luminary David Farber, a University of Pennsylvania professor who tracks developments in Japan. It is also a mess that matters. For, as Farber points out, what the Japanese do affects the rest of us. And while Japan may be the world's second-largest economic power, the Japanese remain dangerously isolated. Networking has the power to change that by bringing Japan closer to the international community. But by the same token, failure to log on to the world's largest network could leave Japan more isolated than ever.

The massive proliferation of the Internet has left the Japanese far behind. As of June 1993, Japan had roughly five networks for every 100 in the United States. Outbound NSFNet traffic from Japan that month was 42,000 Mbytes, roughly the same as that from Taiwan, a country with one sixth Japan's population, and less than half that from Australia, the Pacific Rim's most aggressive network user.

Young Japanese have heard about the Internet and they are eager to get access to it. The irony is that the very people who should be encouraging them to log on are instead preventing them.

The best way to reach Jun Murai, associate professor at Keio University, is, surprisingly, not by e-mail. Instead, you ask one of his acolytes to track him down for you. Initial contact with Murai – via his car phone – is encouraging: "You want to do [the interview] over a beer, or dinner, or what?" he asks. On meeting Murai, you quickly realize why he is so popular with his Internet counter-



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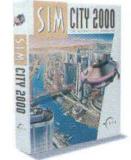
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parts elsewhere. In a country where most academics still wear suits, Murai wears an ancient sports shirt, a beer gut tumbling over his black jeans. He looks a bit like a bear, an impression his deep, rumbling voice reinforces. And while vagueness is regarded as a virtue in Japan, Murai comes straight to the point.

Ten years ago, when Murai was just 28 years old, the Japanese research community was debating how to take advantage of deregulation to install communications networks. Discussion centered around which of the proposed Open Systems Interconnection architectures to adopt. To Murai, such meetings were a waste of time: "I was young, and that was boring," he says. "What I wanted was to have a network, to do actual operation and development, so that we could find out what the problems related to computers and communications were, then solve them."

So he and some friends rolled up their sleeves and started laying cable. Their first effort was the immodestly titled JUNET, a dial-up modem service offered over public phone lines. It proved immediately popular with Japanese academics starved for e-mail, especially after Murai made it possible for them to enter text using Japanese characters. Encouraged, Murai went on to launch a more ambitious project in 1987, the Widely Interconnected Distributed Environment, or WIDE. A backbone network, WIDE is based on leased lines that interconnect local area networks. Owning leased lines is very expensive in Japan, and to pay for them, Murai turned to commercial firms like Sony and Canon. Once again, the network proved popular - today, it connects some 30 research institutes and 40 companies. WIDE also has a link, via the University of Hawaii, to NASA's Ames Research Center, through which Japanese researchers can communicate with their US counterparts.

Indeed, WIDE became such a hit that Murai was forced to turn down requests for connections. A second headache was that companies were not necessarily confining their use of the network to research, as required under the Japanese government's extremely strict definition of appropriate use. An obvious solution to both problems was to set up a company to offer commercial Internet services. In December 1992, Murai and some of his students formed Internet Initiative Japan (IIJ). This is the company to which the Ministry of Posts and Telecommunications refuses to grant an operating license.

Jun Murai's success is a thorn in the flesh

of Shoichiro Asano, a former Tokyo University professor who is in charge of day-to-day operations at Japan's National Center for Science Information Systems (NACSIS). This organization was formed to provide network information services for university researchers. As an official organization, supported by Japan's Ministry of Education, Science, and Culture,

\*

#### Reasons for Japan's Late Start

- Dominance of centralized, mainframebased computing
- · Lack of LANs
- Proprietary protocols
- TCP/IP ignored while government and industry pursued OSI
- Lack of Japanese software and support for routers
- Over-regulation
- · Difficulty of Japanese text entry
- Japan a small country dominated by Tokyo
- · Overpriced leased lines

#### What's Needed for Japan's Catch-Up

- More support, especially financial, from government and industry
- · Better-educated bureaucrats
- More coordination between existing networks
- Elimination of barriers imposed by government between academics and industry
- · More free-access systems
- · More applications software
- Faster links
- · Lower tariffs
- More researchers
- · More links with other Asian countries

Source: Haruhisa Ishida (Japan Internet Society representative)

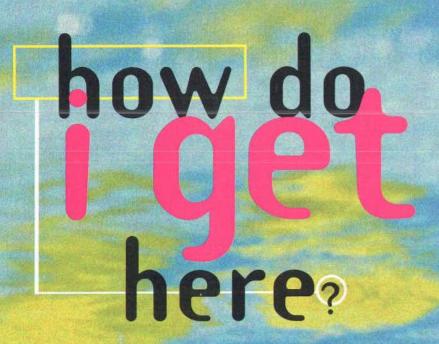
the Center naturally opted to use officially sanctioned technology, notably the Open Systems Interconnection protocols, which were first proposed in the early 1980s. Trouble was, it took a lot longer than originally anticipated for the committees in charge of developing these protocols to come up with the goods, and even when they did, many found them cumbersome and needlessly complex.

Meanwhile, back in the US, an ad hoc set of

protocols known as TCP/IP was spreading like wildfire. Establishment engineers turned up their noses at these protocols, sniffing that they had been designed by young cowboys and were too sloppy for any self-respecting network to use. Maybe they were - and the protocol issue still divides the engineering community with all the ferocity of a religious schism - but by the beginning of this decade, TCP/IP had become the de facto standard for networking in most of the world. It now has an installed base three to five orders of magnitude larger than that of Open Systems Interconnection. In 1991, realizing that it had backed the wrong horse, NACSIS at last began to convert its network to support TCP/IP. By that time, however, WIDE was firmly established in the eyes of the Internet community as Japan's front-runner.

That a lowly assistant professor and his ragtag band of graduate students should have attained such status seems to have embittered Asano, a disheveled and shifty-looking individual in his early 50s. Mention Murai to him and he becomes animated, "For five years, Jun Murai has done dirty things to [the Center]," he complains. Many of these "dirty things" concern Internet Initiative Japan. For example, Asano accuses Murai of being its "shadow leader." (Japanese academics are not supposed to sully their hands through contacts with business.) He also charges that IIJ has attempted to use American pressure in various forms to force the Ministry of Posts and Telecommunications to issue the group an operating license. None of this would matter much if it were just a case of sour grapes. Unfortunately, however, Asano has the backing of the director of NACSIS, Hiroshi Inose; that gives him the power to do Murai - and, by extension, the spread of Japanese networking considerable harm.

In a society that reveres seniority, the 67vear-old Inose is about as senior as you can get. Back around 1957, as a young electrical engineer consulting at Bell Laboratories, Inose won a basic patent on time division multiplexing, a key technology for combining several calls on the same line, one which all modern telecommunications switching systems use. This reflects a caliber of achievement that few Japanese academics can match. In later life, Inose became dean of Tokyo University's prestigious engineering school, taking up his current position as director of NACSIS upon his retirement from the university. He is a member of the US National Academy of Sciences, an IEEE fellow, and has a string of other awards and prizes to his name. Prime among



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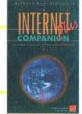




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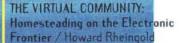






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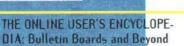




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them is his designation by the Japanese government as a person of cultural merit, an honor carrying tremendous status in Japan.

Today, Inose chairs many of the key policy committees at both the ministries of Trade and Industry, and Posts and Telecommunications. His former students hold senior positions at leading Japanese electronics firms. Indeed, it is scarcely an exaggeration to say that few Japanese involved in information technology are not beholden to Inose in some way.

Inose was not available to be interviewed for this article: His schedule was booked up for two months. But most people who have met him are struck by his charm and gentility. Hell, the man even writes poetry.

But inside the velvet glove is an iron fist. Many Japanese criticize Inose for throwing his weight around, but few dare to do so openly. One of the few is technology journalist Yukihiro Furuse. In the November issue of the monthly magazine *Shincho 45*, Furuse writes that "probably no one can criticize [Inose] because he has absolute power and he is senior to everybody." Furuse recognizes that networking is of crucial importance to Japan's future. And he is concerned that Inose's behind-the-scenes style is not the best way to promote its growth.

One specific charge made by Furuse and others against Inose is that he has used his influence with the Ministry of Posts and Telecommunications to prevent IIJ from getting an operating license. Another is that he leaned on the Ministry of Trade and Industry to prohibit a new computer research project it was supporting from using IIJ to provide network services. Why should Inose care about a bunch of young upstarts like Murai et al? "Professor Inose represents the old establishment," suggests one senior telecommunications executive, "and their idea is that government and national universities should always stay in the center, delivering and exchanging information." In the US, the acceptable-use policy for the Internet was designed to promote the growth of commercial Internet services. The Japanese acceptable-use policy seems by contrast aimed at preventing the growth of Internetworking beyond the ivory towers.

David Farber, who has known Inose for many years, insists that his friend is acting purely in the national interest and for the benefit of the education community. Farber says that Inose is worried about IIJ's claims that it can provide network services for Japan's university researchers at an affordable price. In addition to rendering NACSIS superfluous, this could also lead to the education ministry cutting off much-needed financial support for

networks. An IIJ spokesperson confirms that the company had planned to offer an academic discount plan but were told by the Ministry of Posts and Telecommunications that licensed carriers would not be allowed to discriminate between different types of customers. IIJ is currently providing customers with domestic network service, which it can do without a special license.

"Inose believes that achieving a successful conclusion is a slow, careful process that keeps the support of the education ministry," Farber says. "He gets upset with the cowboy approach" taken by Jun Murai and his associates at IIJ. Inose is not the only one upset by IIJ's behavior. Some of the blame for the current conflict must also go to IIJ's management, and in particular, to the company's president and CEO, Hiroyuki Fukase, Fukase is an engineer by training, not a businessman. He has needlessly antagonized potential investors by asking for money, then neglecting to perform the follow-up visits that Japanese business etiquette demands. Worse, he has annoyed Hikaru Chono, director of the Ministry of Posts and Telecommunications' computer communications division and the official in charge of issuing the license IIJ needs to provide international Internet services.

In Japan, it pays to treat bureaucrats with respect. They form, after all, an elite, and have dedicated themselves to serving their country, working long hours in overcrowded conditions for low pay. The *quid pro quo* is power. Visit a Japanese government office and you will see a constant stream of supplicants who come to beg for official favor.

Chono is a prime example of the bureaucratic breed. A graduate of Tokyo University's law school, he has paid his dues – including a stint as Japan's representative at the CCITT (the international telephony committee) in Geneva, and a year as a postmaster in a remote part of northern Japan. He has been involved with telecommunications since 1975, and he is tired of it. In particular, he is fed up with Fukase. "HJ is a very difficult company for me to understand," he sighs, "they've done lots of publicity and marketing, they've published their tariffs in journals and magazines, but they haven't finished the formalities."

What Chono needs is a letter of guarantee from a financial backer. "If they complete all the necessary documents," he says, the Ministry of Posts and Telecommunications will issue a license "within 15 days, maximum." Fukase claims to have found a backer, the Industrial Bank of Japan, but accuses Chono of having warned the bank not to deliver the

letter of guarantee. Such accusations are typical of Fukase's bull-in-a-china-shop style. In early 1993, he upset the ministry by arranging for a letter from a friend in the US National Science Foundation in support of IIJ's license application to be delivered via the US Embassy in Tokyo. Asano accuses IIJ of urging US equipment manufacturers to criticize the Ministry of Posts and Telecommunications for preventing them from doing business in Japan. Such heavy-handed attempts to use US pressure to bully the ministry into granting a license have had an effect opposite to the one intended. The best thing that Fukase could do at this point would be to go see Chono and try to pour some oil on troubled waters.

But Fukase has not been to Chono's office in months, while Asano reportedly visits him regularly. "They're naive guys," comments one observer of IIJ. "They don't know how to play the game in their own country." Murai would like to wash his hands of the conflict and get on with his research. "I don't want to deal with any of this," he groans, adding in frustration, "What's wrong with me? I'm providing a better environment [than NACSIS], producing researchers and good results, and the companies [that support WIDE] are very happy. The problem is," he concludes, "I'm too young to deal with this kind of thing."

But much as he might like to, Murai cannot simply walk away from the mess that surrounds IIJ. Indeed, as Farber points out, much of the current problem stems from confusion over Murai's dual role as director of an academic research network and would-be godfather of a commercial Internet provider. Carl Malamud, a friend of Murai and author of the technical travelog, *Exploring the Internet*, comments that "the real issue in Japan is the same as in the US. We're moving beyond the myth that the Internet is some academic research project."

What then is to be done to sort things out? Nobody in Japan seems to know. One less-than-optimum solution is simply to let time take its course. Inose is expected to retire in a couple of years. Following his master's departure, Asano says he will probably return to academic life. Well before then, IIJ will likely bring in new management to run its business, leaving Murai to get on with his research. For the moment, however, though a new era has begun, precious time is being lost. And it is time that Japan can ill afford to lose.

Bob Johnstone is Wired's contributing editor in Japan.



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## Class Leader

## Jan Davidson is the first to admit that her goal wasn't to rule over a \$40 million educational software empire: She just wanted to be a good teacher.

### By Connie Guglielmo

hanks to Jan Davidson, there is hope for the mathematically challenged.

Founder and president of Davidson & Associates, Inc. in Torrance, California, the former high school and college teacher has introduced more than 30 IBM/PC and Macintosh-based software products over the past eleven years, including the *Math Blaster* learning series, designed to teach math fundamentals. At last count, more than one



"Her unsuccessful competitors – driven by lots of marketing MBAs – didn't hear the music of what teachers wanted... Davidson is a teacher and understands how educational software is used."

million copies of products in the series have been sold. "If I've done anything," Davidson says, "I've taken away math phobia from thousands and thousands of kids."

But kids aren't the only ones who've gotten better with numbers. Sales of Davidson & Associ-

ates's math, reading, writing, science, and history titles – plus its games – added up, in 1992 alone, to US\$40 million, making the company one of the top three makers of educational software, along with The Learning Company and Brøderbund Software.

Educational software is big news these days, with the Software Publishers Association reporting that sales of home educational software grew 47 percent in 1992 – more than three times the average 14 percent growth for the other software categories the association tracks. And things promise to get even better, with higher growth expected as more consumers find powerful PCs and Macs, now being offered at less than \$1,000.

Although Davidson may be viewed as a visionary today, she's the first to admit that her goal wasn't to rule over a multimillion dollar educational software empire: She just wanted to be a good teacher.

"I was always trying to find things that I could do with

my students to make them more involved in the learning process. The more kids are involved, the more they are engaged, the more they are going to learn and the more successful you are going to be as a teacher," said the 49-year-old Davidson, who holds a PhD in American studies from the University of Maryland. "When the PC hit the market, I thought, 'Why couldn't the computer be used?' Because of its nature, you have to interact with it. It responds to you and requires your attention. No one sits in front of a computer passively."

In 1978, when Davidson bought an Apple II, there was no software available that could benefit her students at Upward Bound, the nonprofit learning center she founded in the late 1970s to offer after-school tutoring. So she designed her own teaching tools, starting with *Speed Reader*, a game designed to increase – what else? – reading speed (she hired a programmer to code according to her own design specifications). *Math Blaster* and *Word Attack*, a vocabulary game, followed. All three programs were distributed through a catalog business run by Apple Computer.

When that catalog folded, Davidson, with encouragement from her husband, Robert (who serves as chairman and CEO of her company), decided to market the products herself. But while Davidson & Associates may have had a fortuitous birth in 1982, it's success has been anything but an accident.

"There were lots of companies that came into the business with much deeper pockets and with seasoned management teams, but they failed," said Ken Wasch, executive director of the Software Publishers Association in Washington, DC. For the past eight years the association has counted Davidson among its board members and, for one year, as its president.

Davidson has built her company into a 300-employee educational publishing empire. Using what she calls a "studio approach," Davidson has kept the company's titles fresh by publishing programs written by smaller, more nimble startups. In April 1993, Davidson & Associates stock began trading on NASDAQ under the symbol DAVD.

"Her unsuccessful competitors – driven by lots of marketing MBAs – didn't hear the music of what teachers wanted," Wasch says. "Unlike those competitors, she is a teacher and understands how educational software is used in an educational setting. She got close to the customers, watching how products are used and getting direct feedback that was not filtered through lots of levels. ▶

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Rarely has one peripheral captured the attention and support of so many graphic artist and software developers. The first revolution was pressure sensitivity. Now, the second revolution is two-handed input.



"Anybody who sees her as just a sweet teacher from the Midwest," Wasch adds, "will underestimate her. If you're her competitor, you'll underestimate her at your own peril."

Through her involvement in the Software Publishers Association, which, among many other issues, lobbies at the state level for educational resources such as computers, Davidson has been a vocal and visible advocate of technology as a learning aid in schools. "Anyone who's seen what a kid can do when let loose on a well-designed computer tool has seen the future," she said in her keynote speech at the National Educational Computing Conference in June '93.

To make that vision of the future a reality, her company has embarked on a new strategy: to develop curriculum-based, multimedia products designed for schools. "The only way in the early days to sell products was to offer supplemental products like *Math Blaster*, because most of the software purchased was used at home to supplement what was going on in the classroom," Davidson says. "What is happening now is that teachers are feeling more and more comfortable with the technology, and they're saying they would use these tools more if they addressed the whole cur-

riculum; if they addressed the core rather than just the supplemental."

Are curriculum-based software systems really the next thing? Educators in California, Florida, and Texas think so. Davidson & Associates started work this year on a \$1.2 million development effort, funded by those three states, to create a state-of-the-art multimedia history and social science system. Called Vital Links, the system is being developed with the Los Angeles County Office of Education and Addison-Wesley Publishing.

"What is exciting to me about technology in education is that not only can you learn what you want, at your own pace, but you can learn in a variety of modalities," Davidson says. "It lets you go from a very teacher-centered approach to a very learner-centered approach.... We're giving students tools to build their own view of history and teachers components from which they can build and present information to students."

As an example, Davidson described how in one prototype demonstration using Vital Links technology, a teacher asked students to use multimedia tools to create a public service announcement defending why people should vote, assuming that there was no Bill of Rights guaranteeing citizens that right. "That's thinking about things – history, the Bill of Rights – from a different perspective. That's exciting."

Of course, over the years Davidson has had to defend educational software against those who label it entertainment or worse, "edutainment," rather than education. Surprisingly, it is parents, and not teachers, who have been the most skeptical of educational software, she says. "Sometimes parents say, 'It was hard for me when I was in school. Are you doing this to make it more simple for them?" I'm not doing to make it more simple or hard. We're doing it to make them more engaged and interested in learning.

"We all have an innate desire to learn,"
Davidson says. "It's a positive, enjoyable, wonderful experience. It's a shame that we have
evolved an educational system that makes
kids hate to go to school. It's a natural desire
to learn. Why shouldn't it be fun?"

Davidson & Associates: +1 (310) 793 0600.

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## The Medium is the Message and the Message is Voyeurism



By R.U. Sirius with St. Jude

She's permed, chubby, hose 'n' heels... Mom. She stands up when Phil or Sally Jessey or Oprah aims the microphone. Her voice rises. Her face tumesces. She's outraged by somebody's sexual behavior. Oprah's eyes register \$\$ - the big score. This is the very essence of daytime talk TV.

In fact, this G-rated money shot is set up for you many times every single weekday. It works like this: The sacrificial "guest" is somehow off-center – not quite your married missionary heterosexual. The host announces the

say, "Men Who Love Shoes Too Much" - then turns to the camera and wonders gravely about this group's impact on society, arming the audience for attack. Then audience and guest have it out over whether or not the guest should exist. After an hour, the shoefucker is led off, back to the Green Room, bleeding profusely. Then everyone is thanked. Commer-

deviant's category -

"Excite or get lost" is the message of the medium.

Mob action is the sleaziest and the easiest for stirring people up. Hey, rather see a video of some people being tolerant?

cials play. Credits roll. I imagine cigarettes being lit all around by audience, guest, and host – as most shows seem to build, then climax.

The ritual being observed here on talk television, and on television at large, is a mapping of classic small-town dynamics onto the media global village. Remember the small town – that tiny-minded, busy-bodied, bully-fisted little burg? No you don't, because your grandpappy scraped it off his shoes in ought-six so he could get himself a life. In this century the urban drift became a stampede. Why? The bright lights were calling, but your ancestors and mine were ejected out of Hickwad by the peer pressure.

#### I Get to Be Me

Now, in the TV global village, rites based on small-town traditions like "conform-or-die," "shut-up-and-take-it," and "you'll-braise-in-eternal-torment" are being celebrated just like in the old days. Now the targets offer themselves freely, cheerful as volcano virgins, because these bad boys

and girls – criminals, perverts, or cultural dissidents – are working for their camera time.

Camera time is the irresistible bait of a media culture. The victims get to be themselves, get to flaunt being themselves – can even try to make converts, before the little red light goes out. After the hatefest, lighting up, the armchair lynchmob can catch the cleanup actions: see the arrests on Fox's *Cops*, follow the trial on *Court TV* and get the smirking denouement on *A Current Affair*:

### The Price of Freedom is Eternal Vigilantes

The operant assumption in these programs is that the media consumers – yeah, we, The People – not only have a right, but a duty to conjure up, maybe even act upon, an opinion about the private behaviors of others. Bring along the rope, Fred. This judgmental mandate is politicized by its daytime-after-daytime repetition. The mode is happily adopted by The People's government, which increasingly takes upon itself micromanagement of The People's lives, down to the level of their amino acids.

Democratization through media is a savage process. Early idealists extrapolated from meetings in the village square, so teledemocracy meant arguments were presented and decisions evolved, presumably in a respectful silence. But in the televisual medium, "man"-at-a-distance is busy filling 500 channels with stuff, bidding for the precious attention of the media consumers.

The new technologies seem to dictate that the pyramid structure of communications will continue to flatten out, that the metalogue of information, ideas, and images won't just come from a handful of media executives and advertisers. Cool, but as more and more people get a voice, a voice needs a special stridency to be heard above the din. "Excite or get lost" is the message of the medium. Mob action is the sleaziest and the easiest for stirring people up. Hey, rather see a video of some people being tolerant?

On the street, people tolerate diversity because they have to – you'll get from here to there if you don't get in anybody's face. But the new media environment is always urging you to mock up an instant opinion about The Other and register that judgment, however harsh or insulting, with no concern about consequences. You can be part of the biggest mob in history. Atavistic fun, guys. Pile on!

#### Voyeur Pleasure

Another small-town archetype, the village Peeping Tom, is still a-creepin.' With video technology getting us an ever-clearer view of the action, and stations like CNN and C-SPAN providing unedited feeds, the voyeuristic experience

crystallizes. A few nights ago I sat for two hours watching the war between Yeltsin and the Russian legislature. Smoking a joint and eating a piece of cheesecake, I was in CNN's hotel room across the street from the action, watching both sides in what looked to me like a game of capture the flag.

The players, of course, didn't have my vantage. Down there at ground level, an individual, real, human soldier ducked behind trees and other protective objects, but remained vulnerable to the camera, even to intimate close-ups of his face...visible to me in my living room in Berkeley, California. I got the full hit of the doubleness of televisual living: being at once integrated into what the "magic of television" makes so completely present to me, while demonstrating to me every moment that I am completely abstracted from it. I spy.

#### Lords of All We Surveil

Caught in the Act, a new program, organizes itself around surveillance. In one sequence, the hidden camera (that quiddity of television, from the perverse Candid Camera to the self-righteous 60 Minutes) catches a woman pitching her rip-off modeling agency. The pitchee is being guaranteed a modeling gig, although

three years in the business hasn't produced job one. We surveil the progress of the scam, lingering over the victim's not quite primetime body surfaces.

Television is by nature a medium for surveillance. The televisual promise has always been that the all-seeing eye would bring us the world as it is, and bring us to the world. All of us would be caught in the act. And so we are. That brief period in which television imitated its preceding media – film and stage – the era in which the artifice of "programming" dominated the medium, is giving way to this: *Caught in the Act* cuts to an armed robbery in a quickservice store, which climaxes in a murder.

One can't help looking forward to the 7-11 Channel, with home shopping opportunities interrupted by live-feed robberies. We can see the arrival of the police, watch them do their gun things and shout the ritual words – "Freeze" – and go through their muscular cop routines as we observe the robbers' terror, the hostages' poignant last moments. Would dedicated armed robbers avoid the stores that participate in this programming? Wouldn't they drive halfway across the state to make their debuts – maybe whipping up costumes, snappy dialogue, pornographic

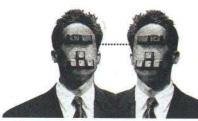
stunts - for a moment of stardom?

The surveillance camera is a defensive weapon for the small shop owner and the neighborhood crime watch. It was the weapon of the oppressed in the Rodney King beating and it has, of course, continuously brought us new views into the mysteries of riot, starvation, and war.

On C-SPAN, we even get intimations of that ol' teledemocracy, as we peep at our Congress in action, along with selected short alternatives: conferences and presentations from the Libertarian Party or the Black African Congress or the American Lawyers Association. Nevertheless I'm still waiting to see any truly countercultural, unconventional conventions on C-SPAN. I want my teledemocracy.

#### Sub- and Sur-realisms

Let's consider the village gossip: creative reporting. Okay, now we're forced to talk about faux realism. The press has gone wild over the docu-this, the info-that, the headline story re-enactments. The happiest moment for info-docunews was when the big three networks showed the same Movie of the Week, same movie, same week: three versions of the Amy Fisher "tragedy." >



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There is TV about TV. The Larry Sanders Show – HBO's brilliant "behind-the-scenes" deconstruction of the talk show – and MTV's atrocious Real Life. With Mystery Science Theater 3000 and Beavis and Butt-head, we can watch comedians, aliens, and even cartoons...watching TV.

#### Mom 'n' Pop Stars

Ex-hicks, for their hit of indecency and outrage, have always relied on the urban gossip feed, the weekly tabloids. TV is only now getting into the market.

America's Most Wanted is simultaneously the predicted bogey of many sci-fi stories the show with the armed vigilante audience - and a flashback to the old Western, wherein the townfolks were deputized and sent out to capture the bad guy. Caught In the Act goes the next step, to gathering evidence. The muckraking 60 Minutes has been joined by ever more venal prosecutors and persecutors until... Dateline NBC checks in, smudging forever the line between investigative and tabloid journalism. Court TV brings you the real-life adventure of people losing freedom. Hey: I've recently been enjoying the slow roast of those accused Mom 'n' Pop killers, the Mendendez brothers. Last week I was engaged by the pathos of sweet Mansonite Patricia Krenwinkles's plea for parole.

#### O Garbage Dump

I also caught Mr. Manson himself. Smart enough to know he'll never get parole, Manson played with the camera, commenting lucidly on the perversity of the situation and seizing the opportunity to pitch his ideology to the viewers.

With his opposite numbers there's no such insight. On Fox's *Cops* we can watch real-life macho bullies kick in doors and shove guns and cameras into the surprised faces of poor people of color involved in the consensual act of trading drugs for money. In a recent episode a poor black family is busted for a few vials of crack and a woman cop talks about how sorry she feels for the scared children. Unlike Manson, she notices no twistiness as she talks to the same Fox cameras that just fed the kids' childhood traumas to a huge audience.

#### The Village Flashers

The intimate invasion of people's lives and psyches is itself, of course, often a consensual act. Why do people give their all to the camera?

There is the reality of attention economics. In a post-industrial, information/communication/entertainment society, many livelihoods depend upon one's being a barker, pitching a particular packet of info-perception to potential customers.

One of the great ironies of information economics is that while information can be trivially copied and the information bandwidth continues to widen, the individual's attention bandwidth is as narrow as ever. In information economics, post-scarcity reaches its reduction ad absurdum.

And also, who can evade the photo opportunity? The media's chops are, like the Jaws of Hell, gaping everywhere. On a day when nothing happens, are they gonna cancel the Six O'Clock News? Fool: It's time for Neighborhood Close-up, with your very own neighbors.

### Village Idiocy, or Bright Lights, Big Planet

But of all the motives for self-exhibition the most persuasive may be the simplest: the desire to loiter in the global village square murmuring, "Hello. Have a look inside. This is who I am." We're social creatures, after all, and prone to hunger for some acknowledgement of our existence from our fellow villagers. In a culture in which so many are acknowledged by the media through sheer volume of opportunity, not getting your fifteen minutes makes you feel pale, insubstantial... disappeared.

Finally, as John Barlow and others have suggested, maybe there's some evolutionary force pushing us towards a complete exteriorization of our individual psychic landscapes, a mutual exposure. Clearly we are wiring ourselves in, each to the other. We seem to be creating through media and communications technology what some have called a specieswide nervous system.

Even if looking at the massive media drains any hope that some literacy or rationality will also endure, remember that the mass value system has come around to supporting hipness. There we may have the thin wedge for some higher level, like they say, discourse: Big planet behavior may be about to drop into our hands. Too bad we're still toting the baggage from the burg we just left.

R. U. Sirius (rusirius@well.sf.ca.us) is the cofounder and Icon-at-Large for MONDO 2000, vocalist/lead theoretician for MONDO Vanilli, and one of the few authentic fake media cyberpunks living today.

St. Jude (stjude@well.sf. ca.us) is a futurehacker and columnist for MONDO 2000. She's a charter member of the cypherpunks and a very nice person. THE VIEW IS SPECTACULAR.
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## **All Music**

## Compiling discographic information on every artist who's made a record since Enrico Caruso is a herculean task. But now it's online. Gary Wolf reports on Michael Erlewine and his 200,000-title obsession.

ichael Erlewine says he's responsible for Iggy Pop's name. "We had a band called the Prime Movers," Erlewine remembers, "and Iggy came over from a band called the Iguanas. He was our drums. We called him Iguana and then we shortened it to Iggy."

In short order, Erlewine and Iggy traveled different



routes through the pathways of pop culture. Iggy's route is familiar, Erlewine's less so. Erlewine dropped out of the performance side of the music business and became a computer programmer and the owner of the world's largest electronic database of information about music. When the secret annals of the music industry are compiled, the chapter on Erlewine may prove nearly as entertaining as that of his former bandmate.

First, an axiom: Everybody is in a band.

Erlewine was in a band. Iggy was in a band. You're in a band. The ubiquity of bands is the easiest – and the hardest – thing to understand about the music business. There are, let's guess, 10 million bands in the world. The largest music archives possess strong evidence of the existence of over half a million album titles. A very big record store carries only about 10,000 records and CDs. So what's up with those other 9,990,000 bands? Where are the other 490,000 albums?

From this simple mathematical incongruity can be derived many of the fabled horrors of the music industry. Power-mad producers, faithless labels, and avaricious managers guard the narrow bridge that spans from a teenager's garage to the racks of record stores. To digital utopians it seems bizarre that music, which can be sent in electronic

form over phone lines or cable, should still be stuck in a production process that requires agents, factories, trucks, plastic packaging, sales clerks, and cash registers. Why not just dial it up? Data compression problems, costly readwrite storage media, and licensing snags guarantee that music on demand probably won't make the phrase "I just got signed!" obsolete before the end of the century.

Still, without much fanfare, the revolution has started, and it's taking a strange shape. It is not the digital transfer of music but the transfer of digital information *about* music that promises to make a difference right away. And because information wants to be free, the people trying to make a buck in the online music industry are confronting, and in the case of Michael Erlewine attempting to harness, some of the more populist and anarchistic tendencies of the network world.

"We are mostly refried hippies, or whatever," says Erlewine. "We don't feel like totally protecting our data." The 50-year-old programmer is explaining why, after painstakingly compiling a database of more than 200,000 music titles – including reviews, ratings, and complete discographies – he is about to make it available to all comers through both CompuServe and a public Internet gateway at Ferris State University in Michigan. Erlewine's project is called the All-Music Guide, and his company is Matrix Software, which also owns a video and movie guide, an astrology database, and an enormous library of Tibetan esoterica.

There is more than a hint of mysticism in Erlewine's plan to profit from giving away his musical data. He hopes that by giving access to the All-Music Guide to the widest possible audience, he will inspire a massive, volunteer "fix-it" effort to close the gaps in his files. Appealing to the know-it-all tendencies of computer users everywhere, he's saying: "Here it is, kids. Now make it better." Erlewine's online database will include explicit requests to users to suggest corrections via e-mail, and no mechanisms will be in place to prevent pirates from downloading the whole huge collection.

Erlewine's information usually goes out over more conventional channels. He has a 1,200-page book, The *All-Music Guide*, published by Miller Freeman. And there's a big fat CD-ROM coming from Compton's New Media, which will sell for about US\$49. To produce the book and

Appealing to the know-it-all tendencies of computer users everywhere, Erlewine put his data online and said: "Here it is, kids. Now make it better."

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the CD-ROM, Erlewine employs a staff of ten people and hires some of the top names in music criticism as regular contributors. The music librarians and freelance critics identify important albums, rate them, trace their influence, and write or reprint musicians' biographies.

Nonetheless, it's hard to fathom a business strategy that basically calls for giving the product away. But that's more or less what Erlewine is doing by loading the database at Ferris State. The All-Music Guide will be available on CompuServe, which, while not free, will include the database among its "extended" rather than "premium" services, meaning income to Erlewine's company will be minimal. Nonetheless, his motive is profit. He is casting his net into the digital seas and hoping the catch multiplies.

"There are countless recordings out there," says Erlewine. "Nobody has them all and nobody knows them all. Taking a database like this to the public is the only way to refine it, because the people have the records."

Compiling discographic information on every artist who's made a record since Enrico Caruso gave the industry its first big boost is a monstrous task. "We got into it before we knew it was impossible, before we knew what a stupid thing it was," he continues, "but now we're deeply into it, and it has to be finished."

There's a personal side to Erlewine's urgency. He sold his extensive record collection in the early '70s and when he tried to replace it, he faced difficulty navigating the maze of rereleased titles, anthologies, and second-rate CDs. But the commercial imperative is perhaps even more compelling. Music databases are the heart of the new interactive kiosks used in record stores to provide better service to customers; they are also in use behind the counter in the stores' electronic inventory systems. The company with the best database will be in a position to license it to the most record stores.

While the electronic inventory systems are more or less invisible to shoppers, the kiosks are not. As retail music stores become larger and more impersonal, the knowledgeable clerk or store owner who can be trusted to recommend new material becomes more rare. Chain stores are turning to electronic databases to fill the gap. Answers to questions a music buyer might have are obtained not from a hip local clerk who has 60 milk crates full of albums stashed away in his or her bedroom, but from a machine that resembles an ATM. Tower Records has its MUZE devices, Musicland is launching its Sound Site system, and many of the country's 10,000 or so record stores are hungry for data. Erlewine has data, and so do several of his competitors, but nobody has anything near a complete set. Total knowledge, posits Erlewine, is only available through exchange with the entire community of listeners, discographers, hobbyists, and collectors.

"Eventually," Erlewine says, "it's going to crystallize. A lot of experts out there are languishing, and this is an area where they can contribute and get their names in lights. When we put it online for everyone to use, people will complain when they find something that is not right. If we get some bad data, it won't be long before somebody points it out. We have the best data around, and it's filthy," Erlewine admits. "Anyone who knows data knows that it is immensely difficult to get clean. We are going to put it out there and let people challenge it. We feel that the data will eventually come into focus."

Erlewine's theory resembles the scenario created by John Brunner for his proto-cyberpunk classic, Shockwave Rider. In Brunner's novel, a government-sponsored gambling system, called Delphi, is used to predict the future. Shifting pari-mutuel odds on such questions as "When will genetic optimization become commercially available?" provide access to the intuitive and analytical wisdom of the entire society. In Brunner's book, however, glitches soon appear. The people in charge can't resist manipulating the odds. Erlewine's avant-garde system of database development faces an even more obvious problem: What if the people are wrong? Even the most transparent facts can become the topic of heated debate, especially in a music database. (Elvis Presley: Born January 8, 1935; died ??) Public wisdom, as anybody who reads a Usenet group can testify, is often laughable, and Erlewine doesn't actually intend to give users control over his material. He's counting on people for pointers, complaints, questions, and criticisms.

"We'll bring what people say in here, evaluate it, possibly add it, then send it back out again," he says. "We are going to set up a convection process that will put the whole database into some kind of motion, some kind of vortex. There will be errors at first, people will see them and point them out. We have a whole library of books and microfilm, and we should be able to check it out. The stuff we're really worried about we can check by having people send us photocopies of album covers."

Erlewine licenses his database with, he hopes, an ever improving data set to companies like MUZE, which supplies kiosks to Tower, and Trade Services Entertainment, the publishers of Phonolog, whose Sound Site will be in Musicland. Record stores are currently paying between \$5,000 and \$5,000 per kiosk and about \$100 per month to these companies.

The atmosphere in the world of commercial music information is combative, with large amounts of cash looming for the database owners who ultimately dominate the market. Both MUZE and Trade Services maintain their own list of currently available CDs; they use Erlewine's data only as a source of ratings and reviews. These companies include only music that is currently available to customers. Erlewine, by contrast, has a more purely musicological project: He wants to list everything. Not only list it, but rate it, describe it, explain it. Ultimately, Erlewine's customer is not only the record store, but also the individual listener who wants to learn more about music.

The attempt to reach individual listeners directly with electronic music data has radical implications – both musicological and commercial. Erlewine is in the vanguard of those attempting to guess what new direction the music industry will take as the digital delivery of music information challenges the dominance of retail stores.

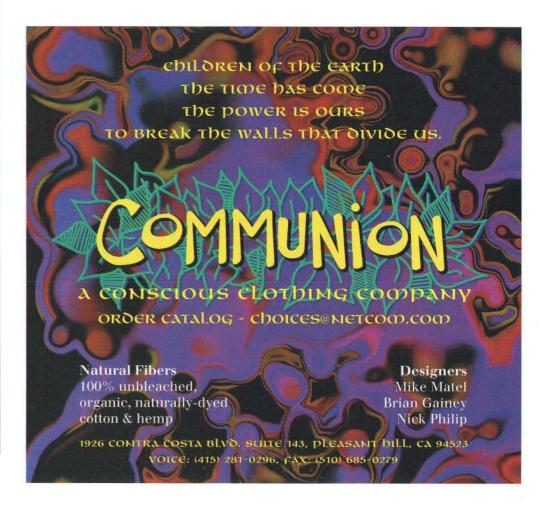
Yes, the digital delivery of music information does pose a challenge to retail stores, and no, you still can't download most albums. But you can order them, quickly and easily, via the Internet through services such as the Compact Disc Connection. The Compact Disc Connection lists more than 60,000 titles, putting even the largest retail stores to shame. Finding any title by any artist usually takes less than two minutes.

The ability to order albums from an easyto-use online system is a direct answer to the frustration every music fan has felt searching for a particular record in store after store. And the online solution appeals to record companies as well.

"We have a real problem," acknowledges Andy Allen of Island Records, whose company does more than \$100 million worth of business. Island is responsible for Bob Marley and U2, whose records can be found in most stores, but it also carries less famous bands whose albums never make it to consumers. "We just had a record out by a band from Haiti," says Allen, "that reached number one on the *Billboard* World Beat chart. There are



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\*\*\*\*/2—MacUser Magazine (Version 1.0 reviewed; version 1.5 shipping.)

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ten thousand record stores in the United States, and probably fewer than 250 carried the record. What we've found is that you can capture listeners' imagination when they hear your music on the radio, but they still need access to the album, and retail may not be the answer."

Online record-ordering services like Compact Disc Connection are often compared by industry insiders to clothing catalogs; they are seen as a supplement and not a threat to the retail environment. But there's an important difference between a clothing catalog and an online music service. Compact Disc Connection doesn't show you just a small slice of the total market. It shows you everything or nearly everything. No clothing cata-

Erlewine wants to list everything.

Not only list it, but rate it,
describe it, explain it. Ultimately,
Erlewine's customer is not only
the record store, but also the
individual listener who wants to
learn more about music.

log holds even a fraction of the inventory of Macy's. But CDC holds six times as much as the largest record store. If you want something, especially if it's not on the charts when you want it, your chances of finding it are probably better on CDC than at any store in the world.

As music fans discover these interesting new possibilities, Erlewine's database project is likely to come into its own. When you have the power to order what you want in an instant from your desk, a database that not only tells you what CDs exist but also offers clues as to what they contain becomes very important. In a record store, you can browse any section looking for artists on familiar labels or for CDs with seductive blurbs on their cases. Similarly, on Erlewine's All-Music Guide you can browse by music style, look up specific albums, and find well-known critics' reactions to recommended choices.

"The idea of a guide went out in the '50s," Erlewine preaches, "but the All-Music Guide is just the beginning of the American public's willingness to be guided electronically." Erlewine imagines that when people can choose any CD they want, they will miss the more structured environment of the stores. He believes that without a structured, electronic guide, listeners will get stuck in familiar, boring habits. "It's like with the radio stations becoming more specialized," he explains. "There is a better chance of your hearing more of what you know you like, but less chance of hearing something you didn't know you would like. If we say, 'okay, we can give you any album that was ever made, what do you want to hear?' people will be stuck in one genre and not be able to break out of it." The solution, according to its creator, is the freely available, publicly vetted All-Music Guide.

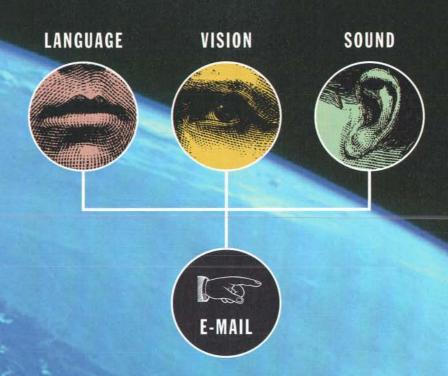
For now, Erlewine hopes that giving his data away online will improve its worth to purchasers of the book and CD-ROM, as well as to record-store licensees. But, as online sales of albums increase, Erlewine plans to turn his All-Music Guide into a retail outlet similar to the Compact Disc Connection. You will be able to type a few commands and enter your Visa number, just as you can on the Compact Disc Connection (we've tried it, it works great), and a few days later the CD arrives in the mail. The premier online musicologists - all you Usenet gurus not withstanding - will be the newfangled sales clerks, the electronic tastemakers and value-added entrepreneurs of the ether.

If you think about it, there's something highly weird about all this. If Erlewine's strategy of public participation goes according to plan, he and his staff of critics and librarians will be managing and supervising a self-propagating process. In the dreams of this refried-hippy-turned-online-database-manager, the masses will be advertising records to themselves. Erlewine will just supervise the activity, deliver the product, and bill the record companies for his percentage.

The prize at the end of the electronic rainbow is a consumer perpetual motion machine. Erlewine calls his database-development process "a vortex," and it does seem strangely and fascinatingly circular. A snake eating its tail – could this be the future of network commerce?

Compact Disc Connection: *holonet.net*. Type CDC at opening prompt.

Gary Wolf (gwolf@well.sf.ca.us) is a columnist at SF Weekly and co-author of Aether Madness, a travel guide to the online universe.



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## **Insanely Great**

### An ode to an artifact -

## the computer that changed everything



By Steven Levy

he shape is now a familiar component of our culture, as instantly recognizable as a Volkswagen or a Coke bottle. But in November, 1983, two months before its public unveiling, I had never seen anything like it. All I knew was its name - Macintosh - and that it was supposed to change the world.

Someone flicked the machine on, and I knew right away:

it would change

moment, when one said a computer screen "lit up," some literary license was required. Unless the display was something from a graphics program or a game, the background on a monitor was invariably black. providing a contrast to the phosphorescent green (sometimes white) letters. Reading text off a computer

the world. Until that

screen had the feel of staring into the flat bottom part of those toy fortunetelling Eight Balls, where you'd ask the thing a question, turn it upside down, and a cryptic answer would dreamily drift into view. Everyone who used computers considered this one of the standard discomforts. It did hurt your eyes if you stared too long. But we were so accustomed to it that we hardly even thought to conceive otherwise. We simply hadn't seen the light.

On my visit to Cupertino that day - I was lucky enough to get a sneak preview - I saw many things I didn't know a computer could do. By the end of the demonstration, I began to understand that these were things a computer should do.

I also met the people who created that machine. They were groggy and almost giddy from three years of creation. Their eyes blazed with Visine and fire. They told me that with Macintosh, they were going to "put a dent in the Universe." Their leader, Steven P. Jobs, told them so.

They also told me how Jobs referred to this new computer: Insanely Great.

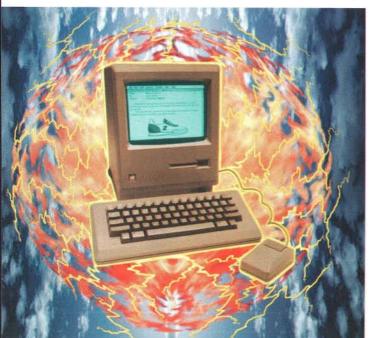
Very few tools transform their culture. Macintosh has been one of them. In the decade since the Mac's debut Apple has sold over twelve million Macintoshes - the sales rate of PowerBooks alone is over a million per annum. Extending the Macintosh style of handling information even more broadly are many millions more computers that run systems that owe just about everything to Macintosh, notably Microsoft Windows. But these numbers only hint at Mac's impact.

Macintosh has become a symbol of a sort of intellectual freedom, a signifier that someone has logged into the digital age. On television you see a Mac on Seinfeld's desk. It peers at you in the background of authors' photographs on book jackets. A newspaper reports breathlessly of producers conducting rapturous relationships with PowerBooks, of screenwriters sleeping with them. A magazine writes of a movie mogul who "grows rhapsodic" when he speaks of the device, and credits it for a career change and possibly even resolution of a mid-life crisis.

It took some time for people to see the light, but now it is everywhere: the ideas of Macintosh no longer belong to the future; they dominate the present. And they will shape the way we cope with the future. Macintosh has set a process into motion that will eventually change our thinking about computers, our thinking about information, and even our thinking about thinking. In terms of our relationship with information, Macintosh changed everything.

Sure, Macintosh isn't perfect - at the time of its release it wasn't even adequate. Certainly, Macintosh is but a step in a path that was probably inevitable, the trail leading to a Digital Nirvana where all information, all music, all pictures, all voices, all transactions, and all mental activity gets parsed into seething bits of ones and zeros. But Macintosh was the crucial step, the turning point. Before 1984 the concept of regular human beings participating in digital worlds belonged to the arcane realm of data processing and science fiction. After Macintosh, it began to weave itself into the fabric of everyday life. Macintosh provided us with our first glimpse of where we fit into the future.

Macintosh is actually a creative expression of dozens of people, beginning with an idea first expressed in 1945. Humans often anthropomorphize the objects they use, especially when they become fond of their interaction with those objects. Almost everyone who comes into contact with Macintosh becomes enchanted by its personality. But by and large people seem to regard the emergence of this



Before 1984, the concept of participating in digital worlds belonged to the realm of data processing and science fiction. After Macintosh, it began to weave itself into the fabric of everyday life.



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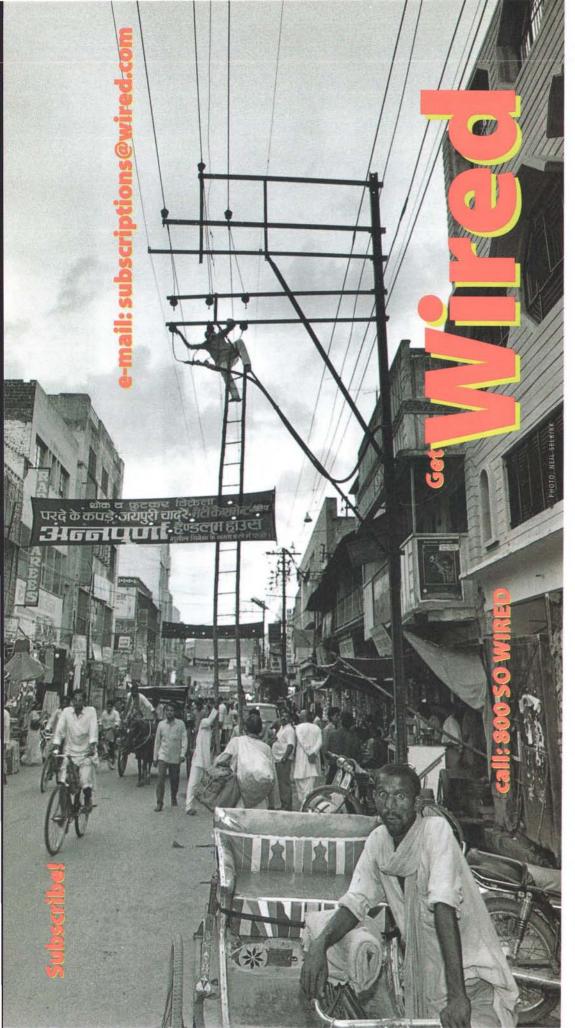
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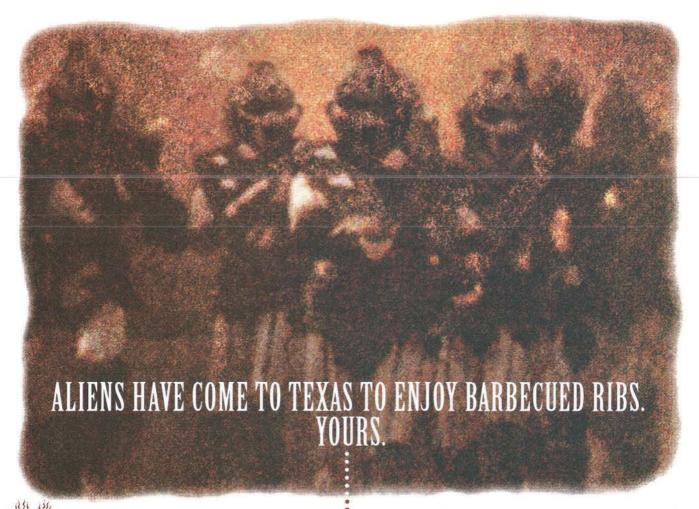
personality as a sort of random phenomenon, something that just happens once the computer leaves the factory and acclimates itself to its new surroundings.

Macintosh does indeed have a distinctive demeanor, but this is a result of human effort and creativity – just as the traits of a character in a novel or film stem from the imagination of its author. It is essential to recognize that Macintosh's creators viewed themselves as artists. Those who conceive of that term in the traditional manner – painters in smocks, poets in garrets, auteurs in film school – have to stretch a bit to snare this concept. The Mac creators are emblematic of a new kind of artist spawned by the protean nature of the computer.

Macintosh makes it clear that we are now witnessing a first flowering of a new form of expression, where architects of technology create interactive software that embodies their own, sometimes radical, visions. By using these products, we (most often unconsciously) experience those visions. They color our own thinking. We are transformed by them. Though the grammars, aesthetics, and even the jargon of this rather ephemeral art form have yet to be fixed, there is a quiet understanding among those working in the front lines of software design that they are participating in the most vital means of expression in our time.

In the Renaissance, a period frequently evoked by those working on or developing products for the Macintosh, painters undoubtedly agonized over the smallest details of their paintings. Every brush stroke told a story. In the early 1980s in Silicon Valley, furious aesthetic disputes were waged over the likes of how many times an item on a drop-down menu should blink when a user dragged the cursor over it. (The Macintosh artists decided on three, but to appease those insisting on a lesser increment, they granted users the option to adjust the number.)

Macintosh did not spring full blown from the corridors of Bandley 3, the low-slung building on Apple's "campus" where the Macintosh development team resided. Its technology was the culmination of decades of effort to drag computers - once known as hulking impenetrable beasts - into the realm of intimacy. The center of this initiative was once the lab of Douglas Englebart (who invented the window and the pointing device called the mouse), it then shifted to the computational Camelot of Xerox PARC (where Alan Kay and colleagues eliminated modes and popped up menus). But the ideas languished until Apple's broad daylight raid on PARC in late 1979, which resulted in the Lisa computer.



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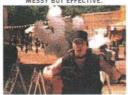
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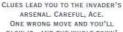
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Lisa was the first to introduce the ideas of the graphical interface into the mainstream, and it featured loads of innovations, such as the direct manipulation of screen icons to actually do work. Yet Lisa flopped in the marketplace - it simply cost too much. It also ran very slowly. But its more subtle failing was its lack of attitude: Bill Atkinson, one of Lisa's key engineers, later admitted that he and his more daring colleagues "were afraid of our [corporate| customers - we didn't want to offend them.... Lisa has a certain beauty, but a certain sterility." A trivial but telling example of this self-censorship came with Lisa's trashcan icon - originally the drawing had a little fly buzzing around the can. This was deemed "too groddy" for the suits. The cumulative effect of this conscientious blandness denied the Lisa of a distinctive personality, which limited the fervor of its users.

Macintosh, on the other hand, was always linked with the artistry of its creators. The original idea came from Jef Raskin: First hired at Apple as director of publications, Raskin was an accomplished musician and a former professor of visual arts. Raskin's choice of hardware designer was made on instinct – Burrell Smith, regarded as the Mozart of circuitry. When Apple co-founder Steve Jobs arrived at the project, elbowing Raskin aside, he brought along his own overwhelming sense of aesthetics.

"It goes back to the first brochure we ever did at Apple," he told me. "It was white, with a picture of an apple. Fruit, an apple. . .that simplicity is the ultimate sophistication. When you start looking at a problem and it seems really simple, you don't really understand the complexity of the problem. Then you get into the problem, and you see that it's really complicated, and you come up with all these convoluted solutions. That's sort of the middle, and that's where most people stop. . . . But the really great person will keep on going and find the key, the underlying principle of the problem - and come up with an elegant, really beautiful solution that works. That's what we wanted to do with Mac."

Everything, from the distinctive casing to the layout of the motherboard, had to meet Jobs's exacting visual standards. He even ruled on the look of the screen icons, rendered on a 32-x-32-pixel grid by Susan Kare, a graphic designer whose business card read, "Macintosh Artist." Given they had to meet that standard, the Mac artists were free to design a computer that fit their own wooly sensibilities. They festooned the machine with all sorts of loony filigrees. When the

computer came on, the first thing someone would see was a tiny self-portrait of the Mac, with a smiling face to indicate that it had successfully performed a memory scan and all its chips were in order. When someone set the alarm in the internal clock, they would click on a picture of a rooster. And when the machine crashed – as it did, too often – a dialog box would appear with a picture of a bomb. (This image actually made some people go berserk with rage – in their view, not only was the computer failing them, but rubbing their faces in it!)

The same attention was devoted to maintaining a consistent appearance in the interface, one which would extend to every program that ran on the Mac. Once the basic topography of windows, menu bar, and desktop iconography was established, the Mac artists sweated the details, refining things like the look of the title bar (the border on top of a window) giving it distinctive pinstripes. This was far more than a cosmetic makeover. It was partly a careful accumulation of nitpicks - frills, pinstripes, curlicues, and the gray tint in the scroll bars - which established what has been called the "look and feel" of the Mac: the Macintosh religion. Compared to the phosphorescent garbage heap of DOS - an intimidating jumble of letters and commands - the world one entered into when flicking on a Macintosh was a clean, well-lit room, populated by wry objects, yet none so jarring that it threatened one's comforting sense of place.

The Mac Team's synapses still fired to the cadence of the 1960s; most of them had managed to catch the tail end of that social revolution and were still hungry enough to want more. Skirting the lip of hubris, they believed that their efforts could cause a reprise of that revolution – engineering itself would explode into art. How could the Lisa artists compete with the cubists, the surrealists, the abstract expressionists of Macintosh?

At the same time, they held a sharp focus on the idea that their audience – people who may or may not regard computers with a measure of terror – would use Macintosh to devise artifacts that reflected the same aesthetic quality. Though artists would, of course, gravitate to the Mac, the hope was that the Mac would make artists of everyone. Because it was just as easy to create graphics on this machine as it was to type – the Mac literally refused to make distinctions between text and graphics – this utopian ideal was considered within the grasp of Macintosh. "Until now, the world of art has been a sacred club – like fine

China," Bill Atkinson told me. "Now, it's for daily use. We're going to make it so easy to be creative that people will have no excuse not to confront their own artistic ability."

Ten years later, the results are apparent. "I think Macintosh accomplished everything we set out to do and more, even though it reaches most people these days in Windows," says Andy Hertzfeld, one of the original Macintosh software wizards. "We loved the Apple II. And we loved art. So we made the Mac a descendant of the Apple II, and a computer for artists - for writers and musicians. We never doubted that the way we did things would catch on. The key is that we kept the Apple II spirit, the crazy irreverence, the anti-authority flavor. Macintosh tells people as they use it, 'You don't have to take things too seriously.' It was great to make a product that has a rebel heart."

The personal digital assistants and pocket communicators we see today are successors to Macintosh aimed at audiences that would ordinarily never venture near a computer. The next generation of television cable boxes as envisioned by Microsoft and its competitors has a Windows-like point-and-click interface. Our remote controls will be pointing devices, allowing us to move the cursors over menus with entries like Nightline or Casablanca. Farther into the future, wearing eye-phone goggles and other virtual reality apparel, the menus may appear before us in space, and the pointing device will be...our fingers. Sounds strange, but once I actually stood in a NASA laboratory and used my data-gloved hand to invoke pull-down menus that shimmered before me like ghosts, and then to choose the commands from these. It was as if I stepped into the Macintosh metaphor.

Ultimately, we can expect to lose count of Macintosh's successors. Long after its departure, Macintosh will be remembered as the product that brought just plain people, uninterested in the particulars of technology, into the trenches of the information age – and did it with an unforgettable artistic flourish. In the process it standardized the crucial bridge from metaphor to reality.

Behold, a dent in the universe. ■ ■

Excerpted with permission from Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything, Viking-Penguin, 1994. Steven Levy writes Macworld's "Iconoclast" column and is the author of numerous books. He reported on "Crypto Rebels" in Wired 1.2.



## THE NEW HACKER'S DICTIONARY

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edited by Eric S. Raymond

This new edition of the *Hacker's Dictionary* incorporates 200 new entries. It supplies additional background on existing entries and clarifies the murky origins of several important jargon terms while retaining its sense of humor. "For anyone who likes to have slippery, elastic fun with language, this is a time for celebration.... *The New Hacker's Dictionary* could be your usage manual.... It is not only a useful guidebook to very much un-official technical terms and street tech slang, but also a de facto ethnography of the early years of the hacker culture." — *Mondo 2000* 544 pp. \$14.95 paper

## THE VISUAL MIND

Art and Mathematics

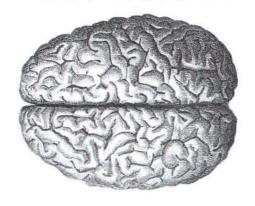
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## John Browning

## Get on Track: There Will Be No Info Highway

Hold that metaphor. The phrase "information highway" is a great way to describe a great idea. But it is also a lie – or wishful thinking at best. It may be, in twenty years time, that information will be as free as a convertible full of sophomores on spring break, and it would be wonderful if it were so. But in the meantime the networks that America is actually building more closely resemble another form of transport: the railroad.

In America, "highway" is pronounced with the accent firmly on the first syllable. Before the lips pucker into wuh for -way, the dream takes hold. There's wind in the hair, sun on the cheek, rock 'n' roll on the radio and baby-smooth blacktop all the way from home to wherever. You may drive in the comfort of your own car, but the road is free because the government built it.

Railroads, on the other hand, are less inspiring. They conjure images of traveling to inconvenient parts of town only to sit in cold, dilapidated stations, surrounded by derelicts, drug addicts, and out-of-work Damon Runyon characters; images of waiting for a train that would be late even if it didn't break down. Worse, railroads have spent much of the past century or so oscillating between unacceptable profiteering and equally unacceptable bankruptcy.

So into which category do information networks fall? Like any new technology, they don't precisely match any of their predecessors. But the parallels between networks and railroads seem a lot stronger than those between networks and highways – and so do the potential costs and benefits of building them. The comparisons that matter most concern infrastructure – tracks, roads, and wires.

The federal government built the highways and made them freely accessible to all. But America's government is not going to build information networks. It can't afford huge networks, nor could it administer them even if it could. Like railways, information networks are being built by people who hope to profit from them.

Like railroads, new information networks are increasingly being built in large, monolithic chunks – starting from the long-distance links and working down to local ones. Just as it was possible to travel from the Atlantic to the Pacific on the railway, long before spur lines branched out to the cattle centers and mining towns of the frontier, long-distance information links are today far better developed than local ones. Telecoms companies, cable-television operators, and others have already installed several times more long-distance fiber-optic cable than they now need – though there are as yet few local networks to provide access.

By contrast, highways – and the Internet, the exception that may prove the rule about information networks – grew from the bottom up rather than the top down. By the time the National Highway Act of 1956 spurred the federal government's building of the interstates, motels and billboards already

stretched from one end of America to the other. South Dakota's Wall Drug Store, patriarch of roadside attractions, was 25 years old. Unlike railway builders – or information-network builders for that matter – the creators of the interstates had a pretty good idea of where people wanted to drive and what they wanted to do when they got there.

But the biggest contrast between railways and highways is regulation. Regulation was the least of the worries of highway builders. Their problems lay largely in stimulating investment – how most efficiently to dispense taxpayers' money for construction. Railroads, by contrast, have been a regulatory nightmare for more than a century. On a variety of issues – including rates, access, and competition – regulators have found themselves caught between vehement, entrenched, and irreconcilable interests. Pleasing everyone is impossible; the best that railway regulators have been able to hope for is to annoy all equally.

Into just such a regulatory nightmare are about to stumble the builders of information networks. The proposed merger of Bell Atlantic and Tele-Communications Inc. (TCl) brings home some of the dilemmas. First, it highlights the fact that the problem of building information networks is not stimulating investment but deciding what, if any, regulations are needed for the flood of investment entering the field. Second, and more important, it highlights how little thinking politicians have done about such regulation.

Knee-jerk political reaction condemns the size and power of the firm the merger would create. But this misses the point. Bigness is a necessary evil in the network business. Combinations of big firms are required to make the huge investments needed to create information networks, even though they also create a real risk – that instead of information highways, America will get information railroads run by information robber barons.

The thankless job of regulators is to broker compromises that combine most of the benefits of big firms with as few as possible of the costs – while simultaneously working themselves out of a job over the longer term by laying the foundations for truly competitive markets. But in order to be effective, regulators need goals. And America's politicians seem to have been so focused on the appealing problems of information highways – stimulating investment and reaping the gratitude of constituents impressed with their foresight – that they have not thought much about what to do if someone should actually decide to start building.

The National Telecommunications and Information Administration recently published a report entitled "The National Information Infrastructure: Agenda for Action." Seven of the nine items on that agenda for action were gifts that politicians could bestow. The other two are mostly talk. The agency wants to set up a panel to discuss what access Americans should



have to networks and another panel to discuss the government's role in setting standards to promote connectivity.

They had better talk fast. The combination of telecommunications and entertainment firms now forming to build information networks poses all of the same regulatory dilemmas as railroads – plus a few new ones. The most familiar set of problems concerns access. Many, including Bell Atlantic and TCI, assume that there will eventually be only one information wire to each home and that through this wire will flow everything from grandma's phone call to the news. Unless they are wrong – for example if wireless communications can rival the wire – ensuring that all forms of information can get access to that wire will depend on a free flow of information.

On access, regulators have made a start. The Federal Communications Commission has long managed regulations aimed at preventing telecom companies with wires to offer regulated 'basic' services from taking advantage of their position to sell more 'enhanced' services. But the combination of

entertainment and communications creates new opportunities for messing up competition.

Entertainment can subsidize communications instead of vice versa. Some of America's biggest networks are already run entirely on the profits of entertainment. Should the entertainers find that selling subsidized communications helps to lure people into the market for the entertainment, they could kill any competitor without access to endless supplies of I Love Lucy and The Wheel of Fortune. The ability to use control of popular entertainment to gain clout in distribution – which in turn can be used to sign up exclusive rights to more popular entertainers – has crushed competition from the soft-shoe and shuffle of vaudeville to movie studios and television networks.

All aboard! The information express is now leaving from channel 500.

John Browning (browning@well.sf.ca.us) is Wired's contributing editor in Europe.



## **Computers as Metaphors**

Next to my bed lies a dormant copy of Japanese Made Easy. It has now been at least six months since I've given up my fantasy of speaking this inscrutable language. I'm far past the stage of actually trying; past the stage of wondering if some osmotic exchange could take place if I sleep near the cassette; past the stage of wistful resignation. "Ah, if only I could but download this stuff into my brain."

There, I've done it again, turned to the megabyte analogy. You see, computers are not only changing the way we write and do our payrolls, they are entering the realm of allegory, of mythic thought. Computers are the metaphor of our time.

If you're over 40, you've already noticed some changes in yourself not covered in the owner's manual: You don't remember anyone's name anymore – telephone numbers yes, (that will go later), but not names. Think of it as a minor erasure on your floppy disk, perhaps due to a power surge that came when you hit 40. And, as you contemplate the loss of a little "gray matter," be comforted knowing there's a disk drive manufacturer by that name.

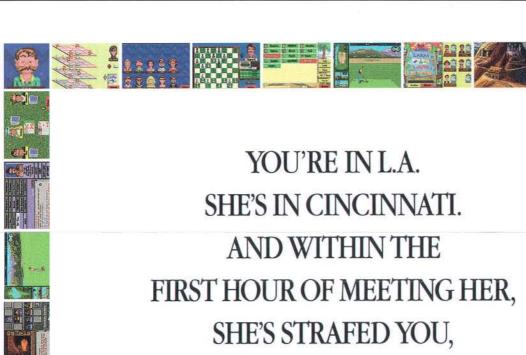
Reality is becoming more virtual by the minute. Anyone who doubts this should watch a little television. Content aside for the moment, consider the form. Sure, it looks like a computer monitor. Not to worry. A West Coast researcher has developed a laser projection device that beams a video image into the retina of your eye. In other words, the movie – not just the monitor – is now literally inside your head. And coming soon to a TV near you is interactivity, as computers reach out and touch someone. Who needs the tactile world when we can slip into a cool gray metaphor – and interact?

Imagine the virtual conference call of the not-too-distant future, in which executive Jones-san, gloved and goggled, is standing in his virtual telenetwork room in New Jersey, shaking hands with the air, or, dare I suggest it, bowing to his virtual partner in Osaka. Remember Peter Sellers in *Being There*, walking around the streets of Washington, DC with a remote control device, trying to change the channel? Well, the spin for the '90s would have us co-opting computer commands. Seems to me there was a song called "Sample and Hold" a while back – that's the right idea. A command from the Apple menu, "Show Invisible," could bring some interesting results. My favorite command comes from software for a digital sound workstation: "Heal the Separation." Really. It's used to make seamless edits. The first time I saw it I thought I had clicked my mouse into the virtual *Field of Dreams*. Was anyone else trying to heal the separation? Where was James Earl Jones? What if everyone in the world tried to heal the separation at the same time? A wild evangelical possibility suggests itself here.

A stage, a soapbox tent in the Midwest, a sweaty barker standing in front of an enormous mainframe under the Klieg lights. Before him, there's a mass of humanity with Power-Books and Newtons wired to spectacles and 3-D headsets, a few pioneers with portable, total isolation helmets – not to mention fiber-optic lines connecting us to the home audience, literally glued to their transponders, receiving not only sight and sound (with an optional laugh track), but virtual sensation as well. The pitchman is in full frenzy: "My friends! I want you to put your hand on your hard drive! I want you to feel it now! I want you to put your other hand in the air. And I want you to heal! Heal the separation! Heal it now."

Then I snap back to reality – hands on the keyboard, writing, clipboarding the tail end of my associations and pasting them into the old inner scrapbook. My 3-year-old daughter comes by wanting to do a drawing on the computer. She is still a relatively blank disk, slowly getting programmed. Yesterday, out of the blue, she looked me right in the eye and solemnly pronounced "Smoke alarms save lives." My wife and I share an





FIRST HOUR OF MEETING HER,
SHE'S STRAFED YOU,
YOU'VE SPLATTERED HER, SHE'S
SMEARED YOU WITH BOOGERS
AND YOU'VE KISSED HER
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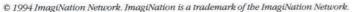












all-too-rare breakfast together. I get up to get the half-and-half, which has been cleared/deleted/blackholed from the refrigerator where it has been since time immemorial. I return and inquire of its whereabouts. My wife looks at me wearily, departs for the kitchen, and returns with the miraculously rematerialized half-and-half, and a triumphant yet bemused expression. "I know who you are," I say to her. "Oh?" she replies. "You are the FINDER." Her response, while not com-

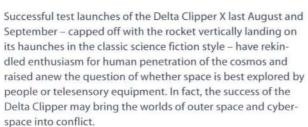
puter friendly, at least acknowledges that I am not a geek or a weenie, nor have I been absorbed by the Borg Collective Mind or the Body Snatcher Podfolk – yet.

I guess it's time to shut down.

Jim Metzner produces the radio series "Pulse of the Planet," and can be heard often on "All Things Considered", "Marketplace," and other public radio programs.

## Paul Levinson Will the Delta Clipper turn Deep Space into Cyberspace?

A new type of rocket will challenge our assumptions about exploration.



Privately financed until now, designed by a breakaway team of scientists and science fiction writers who believe that our trips to the moon may be our last gasp in space unless we do something very different, McDonnell-Douglas's Clipper impressed federal legislators enough to elicit a preliminary commitment for some US\$40 million in funding in 1994. To understand the pathbreaking significance of the Delta Clipper and its single-stage-to-orbit rocket logic, we need to see the error of its predecessor, the space shuttle.

NASA's shuttle suffers from the venerable rocket tradition of delivering a payload of ammunition – the vehicle goes some-place, explodes, and never returns. Thus, although the shuttle was bravely intended to be reuseable, in actual operation none of its equipment can be employed as is after a flight: The huge fuel tanks disintegrate in re-entry; the rocket boosters, jettisoned during launch, require extensive reconstruction after retrieval; and the shuttle craft itself needs months of work after each mission. No wonder that each mission requires a ground crew of more than 10,000 people and costs as much as a billion dollars.

In contrast, the Delta Clipper is completely and almost immediately reusable. Taking advantage of recent material and design improvements, and of a transportation rather than a weapons logic, the Clipper can be launched with a handful of ground support personnel at a cost of about \$5 million. Like the train, the automobile, and the airplane before it, this new lightweight rocket is designed to bring people and cargo from place to place, back and forth – in space and on Earth – with only fuel and seven days of prepping per flight.

This quick refreshability parallels the advantage of the computer screen, with its capacity for displaying an infinity of

letters, over the book and the newspaper, which carry the burden of printing a brand new page for every set number of letters. Indeed, the Clipper is very much a rider of the new information surf: Its first "flight" was piloted from a "virtual cockpit," a screen on the ground that allowed the ship to be controlled as if there were a pilot actually on board. Ironically, the very test flights that demonstrated the feasibility of a rocket construed and employed as a transportation vehicle were conducted with no people aboard.

The capacity to see a world on our computer screen has many rewards. When that world is of our own making, we learn a lot about our internal processes. When that world is of external origin, as it is in space exploration, we can explore it from the safety of our home planet. Indeed, vicarious exploration has been providing evolutionary advantages for eons: Unlike the amoeba, which can know its world only by physically bumping into it and is often obliged to die when it thus encounters something noxious in its environments, higher organisms can know their world from afar via vision and hearing and smell. And humans can know worlds from further away still – via representations replayed in the mind and via all means of communications media.

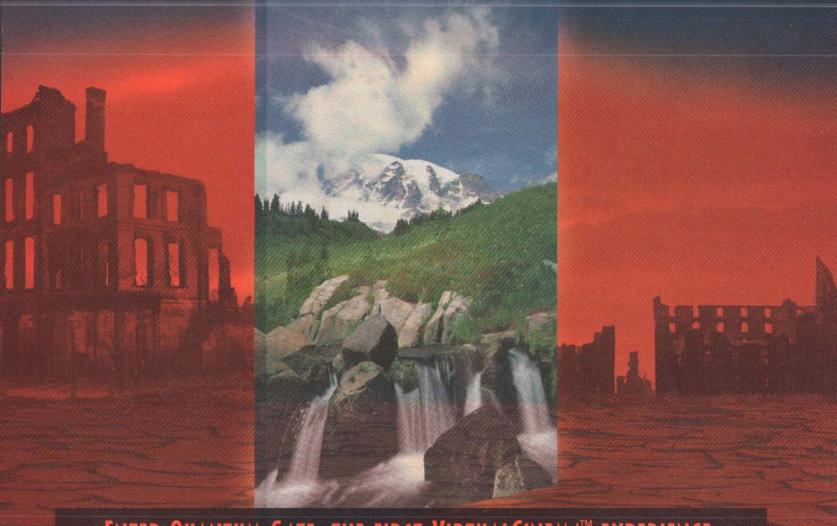
But we pay a price for the safety of all this indirectness. The further we are physically from a world on our screen, the less we are able to directly interact with it. And with our inability to sense all there is to sense of a new world on a screen, to directly do things there, comes a restriction on our capacity to truly learn more of the unknown. As John Dewey pointed out early in this century, the most profound knowledge often comes from doing rather than seeing.

Cyberspace may reach its true limit in outer space. For these reasons – aesthetic as well as philosophic, practical as well as theoretical – I hope that the promise of the Clipper and its new mode of flight is not thoroughly consumed in virtuality. Let the new worlds that the Clipper brings us be seen via real old-fashioned windows – as well as computer screens.

Paul Levinson is author of Mind at Large: Knowing in the Technological Age, and Electronic Chronicles.



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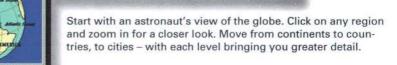


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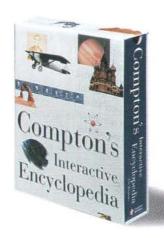


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## Is Advertising Adviruses, digimercials, and memegraphics:

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#### Advertising In the Interactive Age

Super Bowl XLVII, January 2015, Buffalo, New York: Half a dozen Bills fans huddle

To appreciate tomorrow's multimedia networks, don't look to the Bob

around a 40-inch video monitor in Jack Public's living room, hoping the men in blue can

Metcalfes, Ted Nelsons, and Vin Cerfs for ideas and inspiration.

snap a losing streak spanning the last thirteen Super Bowls. The group has been tense

Those techno-wonks won't set the agenda; the Paleys, Sarnoffs, and Dis-

and largely silent through a scoreless first quarter, but when quarterback Jim Kelly, Jr.

neys of the world will. The economics of advertising, promotion, and

hits a deep receiver for a 45-yard touchdown pass, Jack's wife, Jane, sends the popcorn

sponsorship - more than the technologies of teraflops, bandwidth, and

flying and the Albertsons nearly choke on their fat-free Fudgesicles.

GUI - will shape the virtual realities we may soon inhabit.

As the kicker prepares for the extra point, hundreds of marketing executives around the

Wherever there are audiences, there will be advertisers. As media

country crack their knuckles over their keyboards. The programmer cablecasting the game

evolve, so do audiences. Time and geography - more than human nature -

will almost certainly take aread break. For advertisers, the real contest is about to begin.

separate the captive crowds at the Roman Colosseum from user lists on

he kick is good, the announcers say they'll be right back, and Jack's screen turns royal

By Michael Schrage, the Internet. A Roman herald is not a 15-second spot is not an infomercial.

ie. A message comes on from a car company: Watch this commercial and we'll bring a

with Don Peppers,

01-XZ coupe to your house and let you test drive it for a day. "Anybody wanna test drive

Simple broadcast media like radio or television cannot even suggest the

Martha Rogers,

Jack asks. No answer. The message disappears and is replaced with: Watch this

options of point-to-point media like the telephone (telemarketing, 900

numbers, voice personals ads) or multipoint-to-multipoint mass media

and Robert D. Shapiro

commercial and get a case of Wünderbeer for half price. "I'll take that," Jack says, punch-

like America Online and the Internet.

ing a couple of keys on the remote control.

The future of media is the future of advertising; the future of advertis-

At Wünderbeer headquarters in Milwaukee, a computer receives Jack's signal and,

ing is the future of media. The fundamental difference, however, is that

referencing a satellite map of his town, instantly creates an animated commercial in

the design philosophies of digital media will exert a greater influence on

which two dragons from another galaxy battle in the streets of Jack's neighborhood over

traditional advertising than traditional advertising will hold over the

a giant bottle of Wünderbeer. Just as the evil dragon is about to smash Jack's house, the

design philosophies of the digerati. In other words, tomorrow's soft-ads good one drives a neighbor's chimney through the heart of his nemesis, saving Jack's

are going to reflect the values of the Net more than tomorrow's Net will

home and winning the beer. As Jack's converter box spits out a bar-coded coupon for a

evolve into a digital regurgitation of today's advertising.

bargain case of suds, the dragon turns to the camera and offers a toast: "Here you go, Mr.

Conceptually brain-dead traditional networkers like NBC's Tom Rodgers

and Mrs. Public, this Wünderbeer's for you."

utter half-witticisms like "We deliver eyeballs to advertisers." Theirs is a

The world of 21st-century telecommunications, with its bumper crop of marketing

future where the commercial metaphors from radio, television, and direct

opportunities for everything from greeting cards to room fresheners, spawns myriad ways

mail are rigorously imprinted upon any network unfortunate enough

to sell products and learn about consumers. Advertising isn't dead, it's been reborn. - RS

to carry its information in bits and bytes. (Doubters, please logon to

Prodigy....) They just don't quite get it - yet. The more future-oriented

of targeted

marketing,

might not

the human

genome

be the best

database

of all?

multimedia gurus who know all the buzzwords preach the twin gospels of narrowcasting and interactivity: Do you, Internet, take QVC to be your lawfully wedded interoperable digital shopping medium – 'til death do you part?

But make no mistake – as surely as today's PBS features endless pledge nights and corporate advertisements masquerading as public service announcements – tomorrow's digital advertising will be inextricably woven into networks and VR fabrics. The digital David Ogilvy may not have materialized yet, but cyberspace's commercial future is inevitable. There will be billboards along the Information Superhighway.

Pop media, of course, have a rich tradition of subsidy: In the last century, advertising brought mass affordability to the daily newspaper with the "penny dreadfuls;" in this century, commercial sponsorship turned radio and then television into dominant media. The ongoing explosion of personal and portable media – imbued with ever growing quantities of bandwidth and processing power – is creating opportunities for new kinds of advertisements, sponsorships, and promotions. Can the comfortable clichés of Speedy Alka Selzer, Mr. Whipple, and the Bud Bowl see what's coming?

Already, a Sega/Nintendo video game offers innovative advertisers potential levels of customer interaction no traditional 30-second spot could dream of. What better way to burn a sales message directly onto the synapses of an impressionable teenager than to craft an exciting, high-speed video game around it? Maybe the Trix rabbit, Cap'n Crunch, and Honey Bear can be turned into kinder, gentler video games for the wee ones....

The fashionable, faux futurism predicts that this time will be different, that this time new media technology will guarantee the individual the upper hand over the advertiser. Maybe; maybe not. More likely, we'll see these new media renegotiate the power relationships between individuals and advertisers. Yesterday, we changed the channel; today we hit the remote; tomorrow, we'll reprogram our agents/filters. We'll interact with advertising where once we only watched; we'll seek out advertising where once we avoided it. Advertising will not go away; it will be rejuvenated. Here are some scenarios that advertising in the future might spawn.

#### **Sponsored Communication**

Consider this completely logical possibility: PDAs like the Newton, Zoomer, and Eo turn out to be wildly successful. Their owners find them indispens-

able. So they're using these gizmos all the time to send and receive faxes, e-mail, and phone calls. They're making maybe one, maybe two dozen calls a day. Perhaps they're getting twenty or so messages a day, too.

Guess what? That's really expensive. Customers may balk at a mass medium that costs another \$50 a week just to use.

But appropriately packaged PDAs could offer an ideal medium for sponsored e-mail and faxes. (One company already offers a sponsored fax service through the Internet.) If you can program PDAs to screen out unwanted messages and invite ones that interest you, they will become ideal breeding grounds for the latest in software agents. Restaurants, hotels, and banks might be delighted to respond to PDA agent requests asking where one can eat, stay, or find an ATM. Think of the popularity of today's movie and medical referral phone lines.

A mass market of PDAs creates an enormous demand for electronic Yellow Pages. Before the Bell System break-up, the phone company was described as the most profitable publisher in the world because of its multibillion-dollar Yellow Pages business.

If PDAs are as successful as their proponents pray they'll be, they're going to generate a tremendous demand for instantaneous communication and information. Wherever you find a technology mediating instantaneous communication and information, you always find commercial sponsors. Just ask QVC's Barry Diller.

No doubt, many PDA digimercials will prove to be the annoying equivalent of junk mail and those idiotic automated telemarketing calls. But so what...there'll be a nice market in software that screens out the junk and highlights what PDA owners want. Advertising – not just innovative technology – may be the best hope to turn PDAs into the next major medium.

#### Viruses Can Ad Up

Consider this unexpected possibility: David Brin's delightfully prescient cyberpunk novel *Earth* describes something called a "courtesy worm." "It is a guerrilla program – an illegal virus – that goes around targeting people who are too angry and vituperative on the Net. Attracted by unsavory, scatological, and *ad hominem* phrasing, the worm gets into the flamers' system and announces, 'Hello. You have been infected by the program *Emilypost* because your presence on the Net is impinging upon the rights and enjoyment of others. If you'll check your credibility ratings, sir, you

Michael Schrage is a Media Lab fellow. He writes the "Out There" column on the future of media for Adweek magazine. would soon realize that nobody is listening to you anyway. We suggest you try behaving in a more grown-up manner."

Brin envisions a global computer network teeming with viruses both lethal and benign. The Net becomes the key medium for both community and commerce. If an Emilypost virus were to monitor civility, why not a Coca-Cola virus circulating through the Net and attaching itself to any program using the phrase "The Real Thing?" How about a Miller Lite virus that sneaks into any video image of bronzed yuppies frolicking on the summer beach? An Ivory Soap virus that floats into bathtub and shower scenes (so long as they're not too steamy) might be of interest to Procter & Gamble. The Sony logo virus could insinuate itself onto any nifty electronics devices in an image.

Think of these ad viruses as the digital counterparts to "product placements" in TV and the movies. If the Reese's Pieces folks were prepared to pay big bucks to be E.T.'s favorite snack, doesn't it make sense that the candy companies could be prepared to smuggle software simulacra of their products to be props in tomorrow's high-bandwidth computer nets?

Of course, it would be nothing short of an art to design ad viruses that were just appealing enough to be noticed and remembered, but never so intrusive as to be obnoxious and alienating. If that ubiquitous Ronald McDonald advirus on all the kid's programming gets too annoying, then the kiddies – or their parents – will stop patronizing the Golden Arches.

But, hey! – hasn't that always been the challenge for advertising's most creative minds? Some pop culture philosophers would argue that fifteen-second spots and junk mail already qualify as advertising viruses of the most pernicious sort. Don't for a moment think that these adviruses reside only in the realms of fiction. Where you could once send only strings of text on the Internet, you can now transmit still pictures, sound, and video imagery. This all makes for a rich multimedia broth in which to grow precisely the sort of adviruses that could create a network of cyberspace commercialism.

No doubt, some netcrawlers will be virulently anti-advirus. They'll want Lysol-like software to scour and disinfect adviruses from any program before it can be displayed. We'll see an epidemiological battle between the forces of digital commercialism and purists who think commerce has no place on The Net. Of course, we all know who'll win that battle, don't we?

#### Does It Ad Up?

Ray Smith – chair of the proposed Bell Atlantic/TCI multimedia merger giant – likes to joke that, sometime in the future, you may be "too busy watching the telephone to answer the television." His colleague, 124 >

nce upon a time, before remote control devices and VCRs – way back in 1980 – advertisers and consumers had a clear, if uneasy, bargain.

Advertiser to consumer: "You watch my commercials, and I'll pay for the television program."

This worked out well for both sides, actually. Marketers knew consumers would at least hear the ads, even if they went to the kitchen during the break. Consumers got a lot of programming for nothing.

Since its invention, mass media has always been subsidized by advertising. The Sunday newspaper that comes to your door may cost \$8 or more to manufacture and deliver, but it only costs you \$1.50; the balance is paid by advertisers all hoping to catch a glance from you on your way to the sports scores or the local real estate offerings. You can buy *Time* for as little as \$1.09 an issue only because advertisers are willing to spend upwards of \$140,000 to place a single page of advertising.

The deal started turning sour for marketers several years ago, however, with the proliferation of cable choices, the TV remote, and the VCR. To the mass media advertiser, these developments spelled disaster.

But in the age of interactivity, this formerly implicit bargain between advertiser and consumer is likely to become decidedly explicit. We're not just talking

#### Let's Make A Deal

#### (If You Pay Attention, We'll Pay Your Way)

about ordering products and services from the comfort of your couch, either. We're talking about deal city, here.

Imagine getting offers like these when you turn on your television:

- "Watch this two-minute video on the new Ford Taurus, and we'll pay for the pay-per-view movie of your choice."
- "Answer this brief survey from Kellogg and we'll pay for the next three episodes of Murphy Brown."
- "Push the Tell-Me-More button on your remote at any time during this tenminute infomercial, and you might win a Caribbean cruise."

This kind of deal-making is already happening with TV's interactive cousins. One company in business today, FreeFone, offers to pay consumers to listen to ads whenever they dial their phones. The ads are based on questionnaires each subscriber fills out in advance. And they allow callers to receive more information or to get connected directly to the marketer by touching a button on their phones. The average consumer earns \$20 each month listening to ads at 5 to 10 cents each. Another start-up company, HomeFax, proposes to put a fax machine in your home for free if you fill out a one-page product-usage questionnaire every month and agree to receive a limited quantity of unsolicited commercial fax messages each week.

But you can look forward to an even more robust kind of deal-making, brought to you by the "video dial tone." You could elect to watch every program, news show, sporting event, beauty contest, or movie on a 126 ►

Don Peppers and Martha Rogers are co-authors of The One-to-One Future: Building Relationships One Customer at a Time.

# "You can have all the technology you want, but it won't help you if you don't have ideas," says George Lois, chair and creative director of Lois/

USA (shown on our cover with his younger colleague, Richard Kirshenbaum).

Lois creates advertising for such clients as Time Warner, Reebok, Pepsi, and the AFL-CIO, and last year billed more than \$144 million. "I'm a philistine when it comes to technology, but I don't care," he says. "It all comes down to

big thinking. That means being creative."

Creative means coming up with quick, catchy slogans – like "Go to Elle," "I Want My MTV" – or creating daring covers for magazines, or convincing

hero. Kirshenbaum was 26 when he left New York ad agency J. Walter Thompson in 1987 to start his own agency with art director Jon Bond, 29. "All Kirshenbaum & Bond had for an office was a beach chair, a typewriter, and a 7-x-9-foot space on 42nd Street in New York," he says. "We had no air conditioning and it was one of hottest and muggiest summers ever."

Still, it was worth it. In 1990 the Young Entrepreneurs Organization honored him as one of the most successful executives under 30 (second only to Michael Dell). Today, Kirshenbaum employs close to 100 people, and his 1993 billings were in excess of \$100 million. He created those Snapple ads that you can't seem to escape from, and does work for Coach, Hennessy,

### It's the Content, Stupid.

Braniff Airlines to paint its planes pink to attract attention and spur business. (It didn't work.) "George Lois believes that a good ad should work by tomorrow morn-







upscale men's clothing stores. What's his secret?
"Part of the reason we succeeded in advertising
is because everyone else out there was so bad
at it," he explains.

Although Kirshenbaum doesn't represent any

Möet, Kenneth Cole, and many of New York's

Although Kirshenbaum doesn't represent any high-tech brands, using technology is an integral part of the creative process at his agency. Still, he agrees with Lois (who took over the No Excuses Jeans account a few years ago when Kirshen-

ing," says Andrew Jaffe, vice president and executive editor of *Adweek*. "You need to knock 'em dead right away or it's no good."

When asked about how today's notions of advertising might need to be adjusted to work effectively in a digital world, Lois is nonplussed. "I'm the wrong guy to talk to about technology



Henness



ative process.

"Interactive is a too-much-hyped buzzword, and I

baum resigned from

it) that technology

is a tool that's sec-

ondary to the cre-

because I don't think it matters," he says. Sure, he concedes, we'll deliver our messages differently in a digital world. We'll probably figure out new ways of implementing ideas and selling slogans, and ads will be targeted to more precise audiences. But that's trivial. The basic human sensibility that responds to good advertising and legitimizes good advertising, Lois insists, will remain the same. "Look," he expounds. "There are people in this industry who've been trying to figure out how to do TV advertising for 40 years, and they still don't get it. It's in your gut. The day computers will ever be able to do your thinking for you is the day I'll turn into a girl."

If Lois is the grand old man of New York chutzpah, the beat generation's gift to advertising, then Richard Kirshenbaum is a sort of thirtysomething

hate buzzwords," he says. "Everyone's saying 'interactive this, interactive that,' and 'I'm going to be so interactive.' Why doesn't everyone learn how to be interactive with people first, not technology? Then maybe they'll get somewhere." Kirshenbaum grants that in the future our lives might be increasingly focused around computers and online services, but "advertising can only wait and respond to that," he says. Advertising is reflective of its time; people who blame advertising for everything from anorexia to general mental vapidity should take a hard look at themselves. "We don't create a Kate Moss without the world first telling us they want that." – David Dix

David Dix is the editor of Marketing Computers.

James Porto

n 1979, Jenny Holzer began posting random aphorisms and broadsides bearing cryptic messages all over New York City. Since then she has employed language for a new kind of art, creating a large body of work whose apotheosis was a flexible moving signboard touting brain-tugging truisms that spiralled up the tiers of the Guggenheim Museum. Holzer's current project is a virtual reality installation for the Guggenheim Museum SoHo, sponsored by Intel and programmed by Sausalito-based Sense8.

Wired: Your evolution has been from static words on paper to kinetic words rendered electronically to virtual reality. Why VR? What brought you to this medium?

Jenny Holzer: I'm always trying to bring unusual content to a different audience - a non-art-world audience. I think this Guggenheim show is an aberration, though. I think Sense8 and Intel were maybe interested in seeing if this technology could live in the art world, and I'm running in the opposite direction. I'm trying to get out of the art world and go someplace else.

Wired: Like arcades? Holzer: Hey, I hope so.

Wired: How would you see an art exhibit evolving into something

Wired: Was virtual reality intimidating for you, or was it something you were anxious to jump into?

Holzer: Both. The old "both" answer. I'm always embarrassed to display my ignorance, even though I do it time and time again, and there's always that awkward period when I first meet someone and I have to whip out my ignorance and they have to look at it and we have to go on from there. So I was nervous about that, but I work in so many different ways that I'm used to it. For instance, for a project I'm doing in Germany, I'm working on a garden, and I didn't know diddly about plants, but now I know enough to get by. In VR, I now know enough to grunt and point. Wired: You've worked with electronic processes before in your first Guggenheim show. Do you worry that the technology will

become the master in place of the artist?

Holzer: Not really. I think the problem is more whether you can start from zero and make sure everything you put in is right. I've never been particularly paranoid about a medium being overwhelming. I think the real problem is whether you're talking about the most important thing and whether you're doing it in a way that's accessible to almost everyone. And whether you can do it in a way that's not merely didactic - that what you're conveying is



# E N N Y H O L Z E R

#### MULTIDISCIPLINARY DWEEB

that somebody would put a quarter into to experience?

Holzer: Maybe the arcade isn't really likely, but what is plausible is getting this stuff running on Windows. It's more likely that somebody might take these things home with them.

Wired: How did this piece come about? I looked at your "World II" with the head-mount on. It depicts the aftermath of a war, with villagers describing their experiences, often cryptically. You have said that the Bosnian atrocities made these things click in your mind.

Holzer: It was clear that the strategies used in Bosnia are all-toocommon techniques of war, so I thought about how to translate this sort of content into a VR world, and it seemed that it would be much more immediate if the material was spoken by men and women rather than printed out.

Wired: Even though the viewer is moving through space in this work, it's relatively static. The spoken words are more or less just waiting there in the buildings for you. If VR were evolved to the point where you could do anything you wanted, would you do it differently? Would there be a lot of people, for instance?

Holzer: I think not. So much of art-making is about reducing things to the essentials, so I don't feel particularly crippled by this. I don't want it to look natural because then I would be making a documentary film.

Wired: Your artistic progression has been more or less from the ephemeral to the permanent, and now you're moving back toward the ephemeral with VR. Is this a zig-zag or a major step? Holzer: I'm always more at ease when something doesn't actually exist. [Laughs] That's my preference. I like things that are just electrical impulse and no more. Not necessarily neutral, but fleeting.

felt as well as understood. Same problem in any medium.

Wired: You're relying on the techies to help you program your work. Are the technicians going to take over and be the artists of

Holzer: Well, some already are. Not to sound like a multidisciplinary dweeb, but there really is an artifical line between someone who is a real artist and someone who's writing the software for the stuff. You know, some of us came in later, and I would fall into that category.

Wired: Your artistic forebears so to speak - the Duchamps and the Warhols - would they have had fun with this?

Holzer: I think Warhol would've moved in and never come back out. I don't think he would've even been seen at parties if this (VR) had been part of his universe.

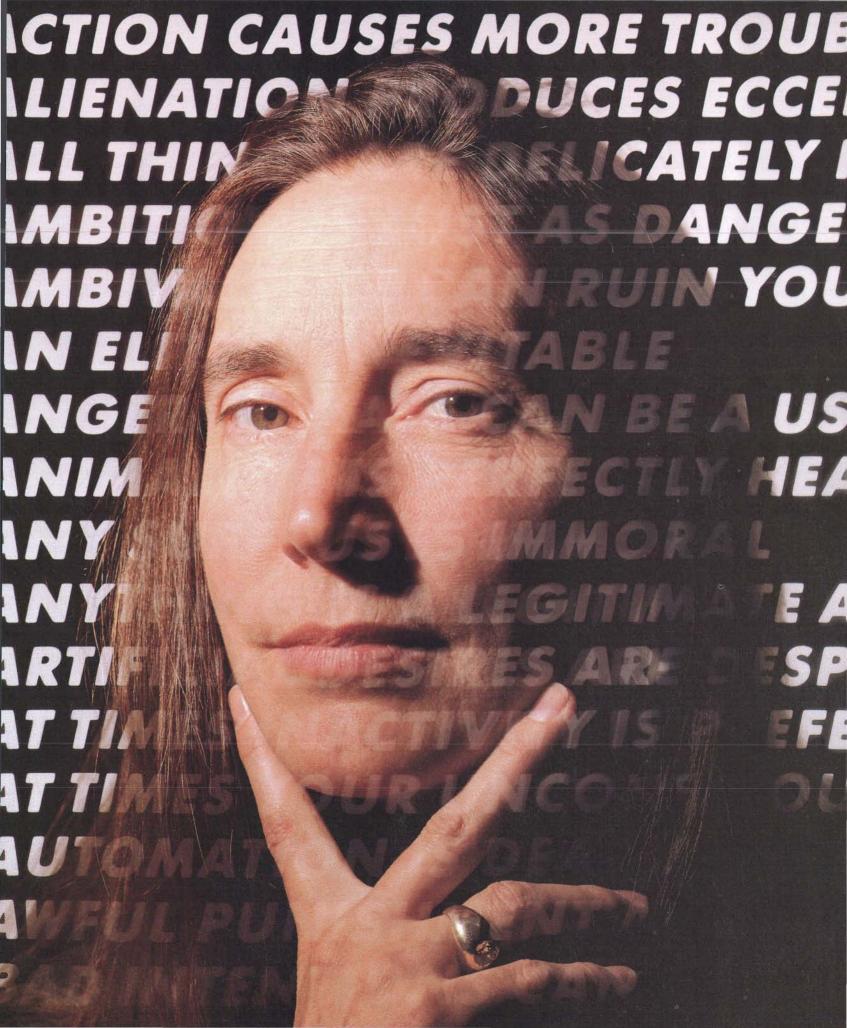
Wired: One of your goals has been to narrow the gap between life and art. Will VR help you to do that?

Holzer: Well, I think in trying to make life seem real enough that one is moved to do something about the more atrocious things. By going really far afield into a completely fake world, maybe there's a chance to make things resonant somehow - or in this case, truly terrifying. To make it as bad as the real stuff that's happening.

Wired: Now that you're jumping into this cutting-edge technology, do you think these machines are going to make our lives better in the end, or do they pose the danger of totalitarianism? Holzer: Of course there's a danger, because - after all - it's people

who're making and using the machines, and people are the truly dreadful and frightening things as far as I'm concerned.

Burr Snider often contributes to The San Francisco Examiner's Image magazine. His profile of Woolward & Partners ran in Wired 1.6.



# STEALTHWATCHERS

#### Armed with Radio Shack scanners and PCs,

#### Steve Douglass and a small group of private citizens are unmask-

#### ing the US Defense Department's black-budget aircraft.

#### Phil Patton reports from Dreamland.

irst Steve Douglass heard and saw familiar shapes – F-117s he had seen many times since they emerged from the black-budget world; Stealth fighters he had tracked and monitored when they were still secret. Then came one that was slower, with a different sound, a different shape.

Douglass's radio scanner crackled, the numbers churned on its readout. He was at White Sands Missile Range, and the sky was filled with B-1Bs and F-15s. He raised his video camera – and the battery warning light flashed. He grabbed seven seconds of video before the machine snapped off.

Douglass had gone that May weekend with his father-in-law, Elwood Johnston, packing his Radio Shack Pro-2006 and other scanners, to cover an exercise near Holleman Air Force Base in New Mexico. He received a tip that something interesting would happen.

Now, in the living room of his ranch-style home in Amarillo, Texas, the country's top military monitor shows his tape. Beavis and Butt-head disappear from the screen, and from a powdery mix of colors emerges a dot, a dot growing larger, a dot becoming a winged bat, a ray-shaped airplane swooping overhead – then the image dissolves to gray grit. He flicks the machine off. "Seven seconds," he says. "You live for those moments. You listen all those hours for that kind of gold nugget."

The "bat" is a still-secret TR5A Black Manta, captured on video for the first time by Douglass – the dean of a new culture of digital scanner buffs who monitor military channels to find secret planes. The image is published here (see page 83) for the first time (the 5,000 or so subscribers to Douglass's *Intercepts* newsletter got a sneak preview last fall). The Black Manta operates in tandem with the F-117A Stealth fighter, and although evidence suggests it was used in the Gulf War, the Air Force has yet to admit its existence.

With the help of a frame grabber, Douglass printed an enhanced view of the bat plane after he returned from White Sands. Then, consulting with his wide network of experts in the industry, the aviation press, and the military, Douglass tweaked the details to create a speculative image of the airplane the government says does not exist.

Thanks to new technology, military monitors and stealth stalkers can listen in on the President talking from Air Force One and hear pilots from mysterious planes called Manta and Aurora. Around 1970, solid state electronics replaced old crystals as the heart of scanners. Before long, you could buy a 200-channel scanner from Radio Shack for about US\$500. Radio Shack has sold more than 4 million 2006

scanners worldwide, but Douglass estimates there are probably only about 500 hardcore military monitors in this country – which is by far the most relaxed nation when it comes to civilian ownership of such equipment.

Several other companies, including Bearcat and Uniden, also make scanners. Current equipment can cover thousands of channels a second, defeating most "channel-hopping" transmitters. Encryption is used at high-level bases, but it's expensive and vulnerable to atmospheric shifts. Until recently, even Air Force One broadcast communications without first encrypting them.

It's all completely legal – except for the practice of listening in on cellular phones, something Douglass finds of little use. When he was suspected of tapping the cellular phone of a Texas congressman –

the FBI paid Douglass a visit. Suits suddenly appeared in the windows of the long-vacant house behind him, and a bug showed up on his phone. The real culprit was later found, but Douglass now sweeps the place monthly for bugs.

Long before they tried to find out about the Manta or the Mach 6 Aurora, monitors, and black birders told us about the U-2 and a project called Oxcart, which turned out to be the SR-71 Blackbird. They insisted that the Stealth fighter existed years before the Air Force released the first murky snapshot and admitted its existence. (Some stealth watchers even believe the Air Force called the fighter the F-117 simply so they could go on insisting there was no F-19, the logical designation for a new plane in official sequence. "Adds up to 19, right?" smirk the stealth watchers.)

To those who criticize their listening in and who accuse them of

Phil Patton is a freelance writer and regular contributor to Wired.







hey call it "Dreamland," the
Shangri-la, the Forbidden Temple of black aircraft. The Groom
Lake secret base in central Nevada,
a.k.a. Area 51, is set amid a bomb
range as big as Switzerland and is
off limits to visitors. Here the U-2
first flew, and the SR-71 Blackbird
and the F-117 Stealth fighter – all in
secret. Only a few grainy pictures of
the place exist; it is illegal to photograph – or even to sketch. Fighter
jocks in the area call it "The Box"
and if they stray into it they are
interrogated, harangued, and
grounded.

Groom Lake is tough for military monitors. Most radio transmissions are encrypted – a costly and difficult process rarely undertaken by the military. But there are a couple of places from which to actually see the Groom base. This spring, secret plane and UFO buff Glenn Campbell, a military monitor and author of the Area 51 Viewer's Guide, discovered the closest and most accessible viewpoint. He named it "Freedom Ridge" and was delighted when he heard the local guards using that name on their radios.

The first Lockheed engineers who

brought the U-2 here in 1954 wryly named the place Paradise Ranch. But sometimes in the early '60s the name "Dreamland" began to appear on military maps. Today, it is omitted completely, and Landsat offers no satellite photographs of the area, although the Russians will sell you one for about \$5,000.

In 1984 the military went to the Bureau of Land Management and had large tracts of land around the base declared part of the Nellis Bomb and Gunnery Range. The perimeter is marked by signs along roads warning "use of deadly force



authorized." But two high points that allow a glimpse of the base to intrepid hikers remain accessible. Last October, the military filed papers to take over those points too. In protest, two dozen stealth chasers, monitors, and UFO buffs climbed to the top of Freedom Ridge for a final glimpse before the shades came down.

I joined them, driving up from Las Vegas past the B-1s landing and taking off at Nellis Air Force Base. The desert seemed like low-res detail on a flight simulator game: RISC landscape. I came to the little town of Alamo, then through a pass in the hills, when suddenly a white stick of gravel road appeared, heading off to Groom. Cars send up dust streamers on this road, as they rise steadily up it, mile after visible mile

Hiking up to Freedom Ridge, we dodged the brambly and fragrant sage and the fuzzy, Muppetlike Joshua trees, we crossed rocks that seem inscribed in some alien cuneiform. We walked a few feet from the perimeter of the base, marked by orange sign posts running across the high desert. On the other side of this barrier were

strange looking silver balls the size of basketballs on poles, said to be motion detectors or other sensors. Some claim these can sniff the difference between a human and a wandering wild burro or rocky mountain sheep – the place is a defacto wildlife preserve. At sunrise, helicopters sweep along the border and semi-private Wackenhut guards, known locally as "Wackendudes," keep an eye on intruders and call the local sheriff if need be.

This day, a few Wackendudes appeared, then retreated. The base unfolded beneath us as we reached the crest – the long white dry lake, a line of buildings, fuel tanks, an old bus, satellite dishes, a big hanger said to be for the Mother Ship, and a seven-mile runway.

The only black birds we saw that day were ravens – eight or a dozen hovering near sunset in the thermals at the edge of the rocks, spiralling in formation. As night fell, the lights came on in the base below, where personnel were probably watching the World Series more intently than they watched the few people, high above Dreamland, watching them. – PP

endangering national security, Douglass and other monitors answer: "Hey, Radio Shack sells to the bad guys too; anything we can hear, the spies can hear too."

n Douglass's thickly carpeted retreat, six scanners work steadily, hopping from channel to channel – short wave, VHF, UHF, sideband – all feeding into a little voice-activated Radio Shack tape recorder that vacuums up every scrap of voice, packing a day's talk into 90 minutes or so that Douglass listens to late at night. After years of practice, his ear strips away the static; he listens simultaneously to stereo, television, and multiple scanners.

Models of planes hang from the ceiling, pictures of planes line the walls. In one corner lurks a huge oscilloscope – military surplus – and a Hallicrafter's short-wave set, packed with tubes, picked up for \$25 at a garage sale. There are maps of military bases and of New Mexico, as well as a Landsat photo of the F-117 base at Tonopah.

Red and blue lines on a map show main air routes, and refueling courses. Amarillo is dead center in the heart of the country's military flyways. "Why go to Groom Lake," people ask him, "when the planes seem to come to you?" Douglass has been uncanny in catching, say, F-117s coming almost over his house. "It's as if they know where you live," his colleagues joke.

Flying high and fast, taking off and landing from secret bases of sand and sage as big as Switzerland, the black aircraft elude the senses: By the time you hear them, they have passed. But as Douglass knows, a scan of radio frequencies will tell you where to look.

In one of the coups from which his reputation was made, Douglass took the first pictures of the "donut on a rope" contrail associated with a mystery aircraft, possibly the long-rumored Aurora reconnaissance plane that the Air Force denies exists.

Now he shows off his latest find, the Black Manta. He loads sound bites captured at White Sands onto Soundscan files on his Performa 450. This allows him to set them off one by one, clicking each little folder, so they explode like little firecrackers, with sharp sparks of voice amid the smoke of static.

"You've seen one of these before, haven't you, Steve?" says the voice of one airman talking to another (the coincidence of the name seems like a taunt). And the pilot complains, "I've got a couple of screws loose on the heat shield." The tail number is given – 806 – but F-117s stop in the 600s. All this tells Douglass the airplane is an unusual one – almost certainly a TR3A or another secret plane.

The maintenance and security people talk about the arrival of a VIP in the morning. Later, Douglass would discover that General Colin Powell, then chair of the Joint Chiefs of Staff, had been visiting El Paso, Texas, the day before. He suspects Powell might have made an unpublicized side-trip for a glimpse of the Black Manta.

ouglass and his wife Teresa, an artist and computer whiz, write and publish *Intercepts* – a newsletter for monitors – from their home. Douglass also runs a BBS and operates the Above Top Secret forum (under Aviation, Military) on America Online. He is a stringer for CBS, and monitors fire and police channels for the *Amarillo Globe Times*, where he spent six years as a news photographer.

He's just finished *The Comprehensive Guide to Military Monitoring*, which is likely to become the bible of military monitoring, sharing tricks, frequencies, and some of the wonderful American music of callsigns and radio vocabulary. In the pages of *Intercepts* he runs letters and columns above the code names of correspondents: Darkstar November, Big Red, Lone Star, Ghostrider – some of them people with

jobs they don't want to jeopardize by using their real names.

Douglass has subscribers at CIA headquarters in Langley, Virginia and throughout the military. His followers are hackers of a black-budget world, an underworld that costs American taxpayers about \$16 billion. Looking at the federal budget, it's hard to figure out how all that money is spent. But one can see where it ends up: The parking lots at Lockheed remain full and analysts show the sum of its work from federal projects swelling from \$53 million a few years ago to some \$400 million last year.

Bubbling away on an old Commodore 128, soon to migrate to a Mac, Douglass uploads selected items from the Intercepts bulletin board to America Online. On AOL, he finds, many stealth chasers are meeting each other for the first time. The service, Douglass says, has become a clearinghouse for monitors to share military intelligence. "It's almost like a public intelligence network," he says.

ouglass's frame-grabbed print of the TR5A looks at first glance like a flying saucer. No wonder monitors are often equated with the UFO gang. "That word is misused," he says. "Yes, (secret military planes) are objects, they fly, and they are unidentified." Some of his subscribers are saucer buffs; others threaten to cancel their subscriptions if "any of that UFO foolishness" shows up in his pages. But, like it or not, some of the best-informed stealth watchers believe that the military is "reverse engineering" alien craft at a site called S-4, near Papoose Lake inside the military reservation south of Groom Lake in Nevada.

The ideas of both secret planes and flying saucers strike deep chords in the collective unconscious. They may be the demons and the angels of our time. The two groups merge almost seamlessly into each other. Descriptions of sightings sound similar: "there was a very, very low rumble, like air rushing through a big tube" or "the lights had a diamond shaped pattern and the object turned rapidly and dashed away."

"They really are unidentified flying objects," says Tim Weiner a *Philadelphia Inquirer* reporter who dissected the black budget and described secret aircraft in his definitive book *Blank Check*. "Sent by a mysterious alien civilization – the Pentagon."

The best places to monitor are in the west: Tonopah, Nevada, where the Stealth fighter was based; Holloman AFB, New Mexico; Edwards Air Force Base in California; plant 42 in Palmdale, California run by Lockheed; the mysteriously shaped radar cross section test facilities at Tejon Ranch, California, and Groom Lake, the holy of stealth holies.

In addition to the TR5A, which hunts in concert with the F-117 and seems to be a reconnaissance and laser designator craft, the plane that draws the most speculation is called Aurora. Its real name, if the craft does indeed exist, is not known. But many reconnaissance programs have been given names related to the dawn. In 1986, a censor's slip left a line billed "Aurora" unblackened in the public version of the Pentagon budget. That is the name most often given the new spy plane, although another Pentagon designation is "Senior Citizen." Some say Aurora flies without a pilot – like the remote-controlled drones that plied the skies during the Gulf War, but pumped to supersonic performance. Some say there's a bomber too, perhaps a whole family of strange birds.

There's one stalkers call "The Mother Ship," that looks like a Concorde with stubby front fins, or canards, similar to the XB-70 of the '60s. Others are nicknamed Honey Dripper and Goldie.

No one knows for sure how many real planes these sightings represent. "It is useful to consider mystery aircraft not simply as an engineering product, but also as a sociological and epistemological phenomenon," reads an oddly unscientific sentence in "Mystery Aircraft," a 1992 report by The Federation of American Scientists. That report

concluded that it was highly likely that these craft exist, but unprovable. There is, the American Federation of Scientists says, "a signal to noise ratio" problem in dealing with secret aircraft. Or as Douglass puts it in Texas Panhandle vernacular, "it's tough to pick the pepper out of the shit."

There are all kinds of monitors. *Monitoring Times*, for which Douglass writes a column called "Federal File," speaks to an audience of some 40,000 people, of widely differing interests. Some listen to locomotive engineers, others to ships at sea.

Although military monitoring has been called "ham radio cubed" or "super ham" and the scoops monitors provide are often described in

the press as "ham radio reports," Douglass says the monitoring culture is misunderstood. "Hams say, 'you can only listen?" They look down on monitors," Douglass explains.

Monitoring culture is more closely related to the nation's brief infatuation in the mid '70s with CB Radio.

Motorists listened to CB to find out what the police were doing; many then graduated to police scanners that let them listen to the police directly. Douglass played around with CB until "the idiots all got on."

Douglass grew up in Idaho, where he came to love airplanes after going to local air shows. His work at the *Amarillo Globe Times*, where he used police scanners to track stories, made him curious.

He began to wonder what else was in the air. "It was like the old George Carlin bit," he says, "what's on beyond the edge of the dial, after the knob stops? What are they hiding out there?"

Douglass began feeding information to The Associated Press, then to NBC-TV. His first coup came in 1986, when he picked up transmissions from a Soviet nuclear sub with a critical nuclear reactor problem. In an early sign of detente, US Navy ships rushed to the scene to help out. The Pentagon denied the story, but when an AP reporter brought in Douglass's tape – on which a sailor screams: "It's sinking! It's going down! Radiation counters are going up!" – the military finally

admitted what was going on. Television cameras were present when American ships rescued the Soviet crew.

Douglass heard the troops assembling to invade Grenada, then Panama. During the Gulf War, he fed shortwave reports of Scud launchings from troops in Saudi Arabia to network reporters before their Israeli bureaus heard the sirens.

In 1989 Douglass picked up communications between "Joshua control" and an aircraft calling itself "Gaspipe." He realized it was flying close by. He ran out of his house, slapping film into his Canon AE-1. He could hear the rumbling sound of the engine, even feel it in his chest, but all he saw of the craft itself was "a silver glint of light, a metallic

shape." Even with a 400-mm telephoto lens he managed to photograph only the plane's contrail with the Aurora's purportedly characteristic "donut on a rope" shape, suggesting an advanced pulse-jet engine. *Aviation Week* ran the photographs.

Later, he talked by phone with a pulse-jet engine expert he knows at a military contractor. The engineer played chords on a synthesizer over the phone, striking lower and lower frequencies until Douglass found the one he had heard. "Damn," the engineer said, recognizing that his rivals had perfected the advanced jet engine, "they've done it."

Black planes raise dark issues. Critics say now that the Cold War is over and now that satellites (run by the folks over at the National

> Reconnaissance Office, whose very name cannot legally be spoken by government officials) can see through clouds there is no real need for these planes. Some question the stealthiness of any "top secret" plane that amateurs can pick up on a Realistic Pro-2006 scanner from Radio Shack.

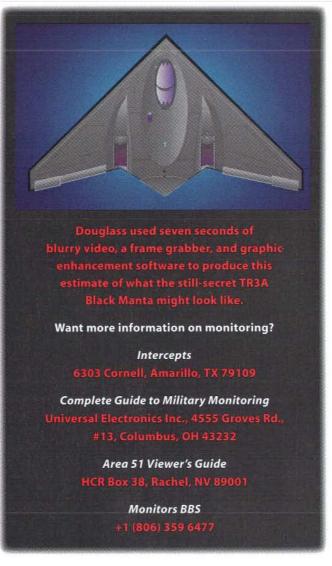
For many, the issue is cost: A covert program costs two to three times as much as an overt one. Others wonder about duplication of research efforts on the black and "white" sides of aviation. The technology of Aurora and other airplanes is close to that for the National Aerospace Plane, or X-30 – Ronald Reagan's Orient Express – a dreamed supersonic airliner. Is the same work being done twice? Or is the \$600 million budget line for the NASP, as one European Space Agency scientist has claimed, simply a cover for Aurora?

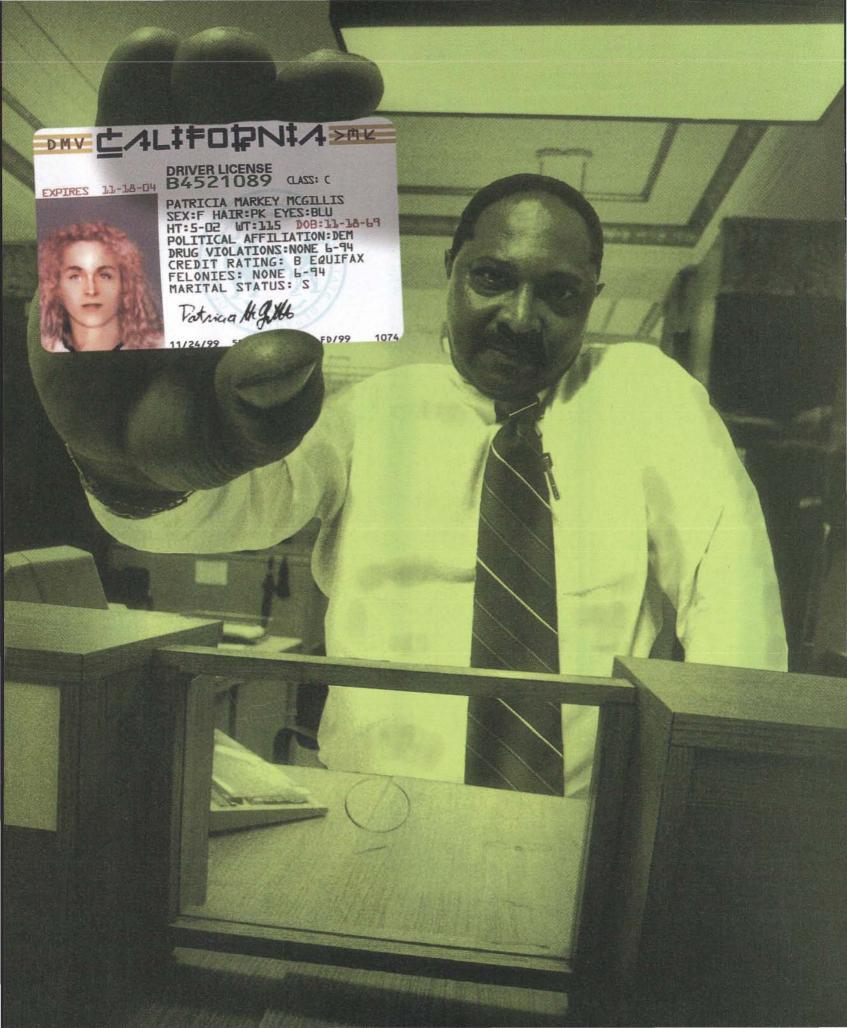
And many suspect that the stealthiness of these airplanes has less to do with escaping detection by enemy radar than with escaping detection by the public, the press, and Congress. Some experts estimate that blackbudget aviation programs are the largest single item in the whole Defense Department budget and that keeping them out of the public eye protects them from congresssional budget cutters.

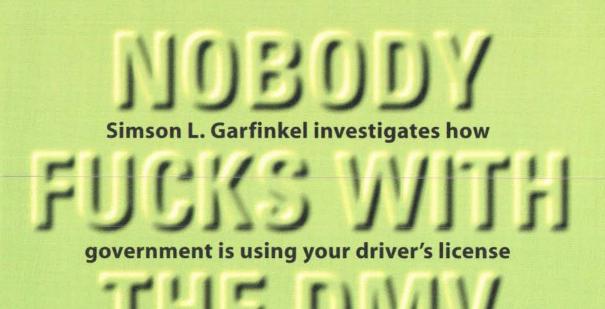
Those who doubt the usefulness of what the monitors do should consider a phone call Douglass got not long

ago from the father of a dead B-1B pilot. The airplane had crashed into a mountainside, and the Air Force blamed the pilot. Investigators came to the father's house, asking him if his son was a homosexual or a drug abuser. Congress was considering further funding for the B-1B and Douglass, after hearing of the crash, checked his scanner tape from the night before. It clearly recorded the pilot complaining of problems with the plane's autopilot. When the news came out, the military brass denied that any "amateur ham radio operator" could have such information.

But Douglass had the tape and was able to tell the father the truth. He can't answer all the big questions, but he could answer that one.







to play Big Brother.

riving is a privilege, not a right. But it's a privilege that has become a virtual necessity. For many Americans, a driver's license is a also license to earn a living, see friends, go shopping, and get away from it all on the weekends. Take away that card, and people will do almost anything to get it back. They'll even pay their parking tickets.

"Suspension of a driver's license is more effective than a court order" for getting money out of people, says David Lewis, Deputy Registrar of the Massachusetts Registry of Motor Vehicles. In Massachusetts, you can't renew your driver's license if you have outstanding parking tickets, unpaid moving violations, or if you owe excise tax on your automobile.

"It's the most effective thing that you can do without throwing them in jail," says Peter Nunnenkamp, manager of driver programs at Oregon's Driver and Motor Vehicle Services. "And it's fairly cost effective." In fact, it's so effective that Oregon has 109 different offenses that can result in the temporary suspension of a driver's license; 50 of them have nothing at all to do with driving.

"Most law abiding people take it very seriously. They pay their fines and pay their reinstatement fee," says Julie Clark, deputy director of Wisconsin's Bureau of Driver Services. In Wisconsin, you can lose your driver's license if you forget to pay your library fines, don't shovel the snow off your sidewalk, or don't trim a tree that overhangs a neighbor's property.

The driver's license has become something it was never intended to be: a badge of good citizenship. Pay your bills to city and state, pay your child support, don't get caught using drugs, and the state will let you keep on trucking. Screw up, and they'll clip your wings. And for those who don't get the message and stay on the roads? In most states, get-

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ting caught driving without a license, or with one that's been suspended or revoked, means handcuffs, a trip down to the local jail, and having your car towed to the pound.

In other words, it's serious shit.

Most businesses and state agencies have a problem with outstanding debt. Bounced checks, IOUs, stolen credit cards – it all adds up. Some organizations write off anywhere from 5 to 20 percent of their debts as "uncollectable."

Most agencies, that is, except for the DMV. "We don't have debt," says Lewis, who oversees all of the Massachusetts Registry's computer and information systems. Last year, the Massachusetts Registry collected more than US\$660 million in fees and fines; less than \$600,000 came back as bounced checks – a whopping 0.1 percent. "How can you afford to stiff us?" Lewis asks rhetorically. "Whatever it is you have, we'll take it. We'll pull your driver's license. We'll take your title. We just don't have bad debt." Lewis pauses a moment to consider his words, then shrugs, his point made: At the Massachusetts Registry, "we walk a very fine line with incredible power over people."

Increasingly, lawmakers around the country are employing that power to enforce public policies that have nothing to do with driving or motor vehicles. Lewis and his counterparts in other states aren't happy with the change, but there's little they can do when legislatures hand down new rules.

"Every governmental agency is looking for every means possible to...enforce the regulations and policies in front of it," says Barry Goleman, President of AAMVANET, a computer network run by the American Association of Motor Vehicle Administrators that links together the computers of the United States's 51 motor vehicle agencies. And increasingly, says Goleman, those state agencies are turning towards the DMVs as a source of data about the state's citizens, a way of providing services, and ultimately, a means of enforcing policy.

The DMVs fit the bill perfectly. On one hand, the DMV database lists

virtually every man, woman, and teenager of each state more accurately than the state's own census or tax roles. (Even people who don't drive usually end up getting "identification" cards, issued by the state DMVs, so they can do simple things like write a check or buy an alcoholic drink.) On the other hand, the DMV has a unique means of forcing citizens to comply with state edicts. In short, the DMV is a one-stop-shop for state agencies that want to reach out and affect our lives.

Ironically, this concentration of information, power, and responsibilities has received scant attention from traditional privacy and civil libertarian advocates. The American Civil Liberties Union, Ralph Nader's Public Citizen, and even Robert Smith, editor of the esteemed *The Privacy Journal*, performed an exercise in collective buck-passing when called to comment for this article. The only group that has made any statement on the issue at all is the American Automobile Association: "Problems or violations of the law not having anything to do with the operation of a motor vehicle should not result in the loss or suspension of a driver's license," says AAA spokesperson Geoff Sundstrom.

Instead, it has been motor vehicle administrators themselves who have been honking the horn, warning that their agencies are becoming Big Brother incarnate. The only problem is that nobody is listening.

avid Lewis is not your typical deputy administrator. At 45, with a medium build, slightly graying hairline, and salt-and-pepper beard, his personal goals are to solve agency problems and find better ways to deliver services to the citizenry – while generally eschewing publicity. Lewis has been one of the key elements in making the Massachusetts Registry one of the most advanced in the world, with visitors coming to observe the system from as far away as England, Australia, and Russia.

Lewis came to the Massachusetts Registry in 1984 after heading the state's Merit Rating Board, which provides records to insurance companies to determine each driver's insurance premiums. (In Massachusetts, premiums are set by the state; shopping around between insurance companies can get the consumer better service, but never better coverage or a lower price.) It was important that the Merit Board have access to up-to-date and accurate records. They didn't.

"We had noticed some problems with Registry records," says Lewis, making a characteristic understatement, then pausing a few seconds before elaborating. Back in 1984, when Lewis joined the Registry, Massachusetts motor vehicle records were a mess. Five months could pass before a newly registered vehicle appeared on the DMV's computer system. Some cars never appeared. The same was true of licensed drivers: More than a few people carried licenses that had no matching records in the state's computer system. It wasn't a total disaster, though, because the state's paper records were the ones that really mattered. Every driver and every car in the state had a matching piece of paper on file at the Registry, the final adjudicator of every record.

Things were not much better with the Registry's handling of money. Although most of the money the Registry collected was cash, not even the most basic cash accounting techniques were in place. The people who issued the licenses also collected payments and put the money into cash boxes. This led, not surprisingly, to many cases of petty theft.

Lewis was part of a sweeping project to bring the Registry's computers out of the 1960s and into the 1990s. The first part of the modernization program brought cash registers at each clerk's station. Theft declined immediately. A few years later, the Registry began installation of its new \$15 million computer system, a massive, unified database designed to track drivers, automobiles, liens, and the cash received for each transaction.

The new system also maintained links between records – so it knew, for instance, that the Simson Garfinkel who had a particular driver's license was the same Simson Garfinkel who owned a yellow Jeep, and that person lived at a particular address in Cambridge. In the trade, this sort of computer is called a "client-based system," and it is still fairly uncommon among the DMVs. (In Oregon, for instance, vehicle registration and driver licensing are currently handled by two separate and incompatible computer systems, although a client-based system is under development.) The new computer made it possible, for the first time, to block renewal of licenses or registrations of people who have outstanding parking tickets, who haven't paid their excise tax, or who owe money to the DMV.

Although a computer hacker might think that an electronic system is more susceptible to fraud and abuse than a paper one, administrators feel otherwise. With good computer security, proper access controls, and lots of log files, they say, an electronic system can make individual fraud or misuse of official position extremely easy to catch. For example, in June 1993 the Boston Herald reported that "two top Registry of Motor Vehicles officials" had gotten their driver's licenses free of charge. Not only did the computer records say that no money had been collected, they also indicated that "a secret law-enforcement computer terminal at Registry headquarters in Boston" had been used to perform the renewals. That sort of abuse might have been commonplace under the old paper-based system; there is simply no way to know. But with computer systems, it's a simple matter to go back through a person's record and see every penny that he or she ever forked over to the state for the privilege of driving, even years after the fact.

The computer, combined with liberal policies regarding the dissemination of public records, also brought to light a number of Registry practices that had been festering for years under the manual system. In one case, a computer search conducted by a local newspaper revealed that an appeals board was frequently overturning convictions of people whose licenses had been suspended for drunk driving. In another, it was discovered that license plates with low numbers were being handed out as favors to friends of prominent politicians. For some reason, such plates are a Massachusetts fetish. "This is the only state where if you have [plate number] 12555 and 12444 becomes available, you want it," says Lewis. Although people from other states might laugh, giving away the plates in exchange for political favors or loyalty was seen as a gross misuse of political privilege; catching the abuse was symbolic of stamping out more egregious misuses of power. Automation had nothing to do with that scandal, but without automation, the story never could have been uncovered.

Both cases in the late 1980s showed unanticipated benefits that could be reaped from computerized records. In addition to making it easier for the Registry to get its job done, computerized records made it a simple matter to use data for purposes completely unrelated to the reason they were originally collected. As such, the records were the ideological cousins to a movement that sought to improve government efficiency by looking for synergy between different government databases – a movement that traced its roots all the way back to the executive branch and then-President Reagan's original claims about "Welfare Queens" who were bilking the system at the expense of the taxpayer.

"The major White House initiative was called Operation Match," recalls *The Privacy Journal*'s Robert Smith. The goal of Match was to pair databases of people who owed money to the government with other databases of people who got money from the government. Match went after government employees who had defaulted on student loans and welfare recipients with large unearned and unreported incomes.

States were encouraged to set up their own match programs: Califor-

nia, for example, started intercepting the lottery checks of people who owed back taxes.

Although they started with tax and employment records, matching programs are custom made for the state DMVs – by far the most accurate databases of state residents. No other state agency tracks the movement of people more accurately than Motor Vehicles. DMVs even have aliens and, in some cases, illegal aliens in their files. Even people who don't drive get identification cards from the state for cashing checks or getting into bars; in most states, ID cards are issued by the DMV and stored in DMV's computer alongside licenses.

ut lawmakers around the country were realizing that beyond just tracking people and forcing them to pay state debts, DMVs were good for *controlling* people as well. Initial programs to block people's driver's licenses and renewals were so effective that legislatures started looking for other ways to exercise this newfound power.

One of the primary targets is kids. Some lawmakers have always felt the need to step in and exercise control over children whose parents would not or could not fulfill their responsibilities. And ever since auto-

mobiles became intractably meshed with the high school mating ritual, they've had a perfect tool at their disposal.

In the mid-1980s, some states began using that tool. In 1985, Oregon passed its "court denial law." Normally, in Oregon kids are eligible for their learners permit at 15, and can get full driving privileges the following year. Under the law, any child convicted of drinking or possession of illegal drugs loses the privilege to get a driver's license until age 17. Any 17-year-old caught and convicted loses the privilege until his or her 18th birth-

day. Although Oregon is not known for its inner-city gang problems, a law that went into effect last November imposes similar restrictions on kids who are caught in any public building with a firearm. That's right: Oregon is dealing with the problem of kids bringing guns to school by taking away their driver's licenses. Ironically, it just might help.

"A driver's license is the most important thing that [young people] strive to get," says Oregon's Peter Nunnenkamp, who says that evaluations conducted by the state show the court denial law to be an effective curb. "[We] use that carrot out there as a way to change behavior in other areas.... They will do whatever they need to do to get these privileges."

Not surprisingly, one of the things that Oregon's youth seem most interested in doing with their driver's licenses, aside from driving, is fraudulently altering the cards in order to purchase alcohol. That's why more than 27 of the 109 offenses that can result in suspension of the state's driver's license have to do with altering the document, making false statements to police officers about a driver's license, or using another person's license to commit fraud.

Another state experimenting with driver's-license-as-social-control is Kentucky. Under that state's "high school dropout law" of 1990, students who drop out of school, have nine or more unexcused absences, or become "academically deficient" (by failing to pass at least four of their classes) lose the right to drive unless they can prove family hardship. By the start of the 1993-1994 school year, 82 of Kentucky's 176 school districts were participating in the program, covering nearly 70 percent of the state's students.

Has it worked? "Yes, I think it has," says Robin Chaney, a spokesperson for the Kentucky Transportation Cabinet. "I've spoken to several different superintendents throughout the state; the school districts which have implemented the law have seen a decrease in their dropout rate. It gives the students an extra incentive to come to school and not to miss so many days of school, and to put extra effort into school work." Last year, according to the Kentucky state police, 2,676 students lost their driver's licenses under the law.

Of course, if license suspension works for kids, who presumably have their parents to chauffeur them around, just imagine how effective it is on adults who need their driver's licenses to earn a living.

During the Reagan Administration's war on drugs, license suspension was added nationwide as another penalty – and presumably deterrent – for the crime of possession or sale of illegal drugs. Unlike jail, license suspension is an easy and effective way to punish a person for a drug offense – and at virtually no cost to the state. Even first-time offenders who plead "no contest" and receive a suspended sentence lose their driving privileges.

Recently, the nationwide campaign against so-called "deadbeat dads" – people who refuse to pay court-ordered child support – has turned its eye to the power of the DMV. In March 1995, Senator Bill

Bradley (D-New Jersey) introduced the Interstate Child Support Enforcement Act, which would force the states to pass laws suspending people's driver's licenses for non-payment of child support. Although a version of the bill died in a previous session, this time conditions seem more ripe for passage.

Wisconsin is the vanguard for new and creative uses of driving privileges. A 1989 law in that state allows any municipal court to suspend a driver's license for non-payment of any fine. The law

covers non-payment of traffic fines, "failure to pay library fines, failure to shovel your sidewalk, failure to trim your trees that might be hanging over somebody else's property," and any other municipal fine that a person refuses to pay, says Julie Clark, of Wisconsin's Bureau of Driver Services.

"It made a lot of work for us," says Clark. In 1992, for example, 90,000 of Wisconsin's 3 million drivers had their licenses suspended; of that figure, 18,396 were suspended for failure to pay non-traffic offenses. That's up from 15,354 in 1991 and 12,305 in 1990.

Each session, it seems, the legislature adds on more non-driving-related offenses that can result in suspension, Clark adds. Unfortunately, Wisconsin's DMV, like most others, doesn't have a choice: Part of the state's executive branch, it is constitutionally required to enforce the laws passed by the state's legislature, whether it thinks they are appropriate or not. To make things worse, Clark says, lawmakers rarely grant the DMV permission to hire additional workers to handle the extra workload. "What really hurts us is little pieces of legislation here and there. They add maybe half a position here, half a position there, and that all adds up to four or five positions that we don't get," she says.

Like most DMV administrators interviewed for this article, Clark is opposed to these non-driving-related suspensions. It goes beyond the fact that the new rules require more work. The main reason, she says, is that suspending a driver's license for a non-driving offense "cheapens" the value of the license. If people can have their driver's licenses suspended for offenses that have nothing to do with driving, they'll soon think less of driving with a suspended license. "Most peo-

THE DRIVER'S LICENSE HAS BECOME

SOMETHING IT WAS NEVER INTENDED TO BE:

A BADGE OF GOOD CITIZENSHIP.

PAY YOUR BILLS TO CITY AND STATE, PAY

YOUR CHILD SUPPORT, DON'T GET CAUGHT

USING DRUGS, AND THE STATE WILL

LET YOU KEEP ON TRUCKING.

ple place a high value and esteem on their driving privilege. If every time you turn around you might lose it, it is not going to be held in such high regard."

ealing with the problems of a suspended license is an old game for one segment of the US population: long-distance truckers. Fact is, it's hard to move a 90-ton rig from New York to San Francisco in three days without breaking a few laws. Truckers have a long history of getting their licenses suspended for the old-fashioned reason: speeding.

They also have a way of getting around the problem: procuring multiple licenses from different states.

Although it wasn't legal to have a driver's license from more than one state, that didn't stop most truckers. And there wasn't much that the states could do about it, since they lacked a single nationwide computer system to keep track of everything.

Then in 1986, Congress passed a law requiring all commercial operators to be licensed according to federal guidelines, and forcing all of the states to develop a computer system "to track drivers so they couldn't go state-to-state getting [additional] driver's licenses, or spreading a bad driving record across many states," says Barry Goleman, president of AAMVANET, the network spawned by the 1986 law.

AAMVANET operates an index of every commercial driver in the United States. When an operator applies for a license in one state, the computer determines whether that driver has a license from any other. If a match is found, the duplicate is brought to the attention of the registry clerk, Goleman says. If the applicant still wants a commercial license, AAMVANET moves the driver's electronic record from the original state to the new one using a system called Electronic Data Interchange, or EDI.

AAMVANET went online in January 1989, and encompassed all 50 states and the District of Columbia by March 31, 1992. There are more than 6 million drivers in the database, says Goleman.

Now that the states have built their network, they're looking for new ways to leverage the technology. Top on the list is the electronic transmission of vehicle titles from one state to another.

Today, titles are paper and, as such, are occasionally forged by people who haven't paid off car loans. Tracking down forgeries is all the more complicated when people try to sell cars across state lines, "If I take a 127 >

There's something not quite right about the tiny Amsterdam flat Inez van Lamsweerde shares with her boyfriend of two years and collaborator of ten. Is this some sort of

Spacecake flashback, or what? "Our friends all feel seasick here – it's the floor," she laughs. "We don't notice it because we live here." Ah – the warped

### Inez van Lamsweerde:

floor: Its wonkiness beats up the optic nerves and leaves the consciousness demanding a re-count. Rather like her photographic work, in fact.

"I don't see fashion as most people do – as something separate, reduced to seasonal hemlines," she says. "It's always with me inside, like a language." But it was not until she left school to study fashion that she first grasped how she wanted to use this language: in photography.

Animate or inanimate, van Lamsweerde's models tend to be highly eroticized, her compositions filled with tension and friction. For the last two years she has worked with Quantel Paintbox operator Karin Spijkers to get the desired look. "Slight manipulations are really the most interesting," she says.

A strength of her work is its deliberate crossing of boundaries. Thank You Thighmaster (left), a series of life-sized doll-women, was produced by digitally grafting the face of a doll over the face of a model, then stretching the real skin back over. The rest of the body and hair is "real," except skin was redrawn over the nipples and the genitals were removed.

Final Fantasy is a challenging series of photographs inspired by the hype surrounding skinny supermodel Kate Moss. "When Corrin Day photographed her in underwear for English Vogue, everyone was going 'child pornography blah blah.' I decided to go a stage further and use professional agency models, age 2 ½."

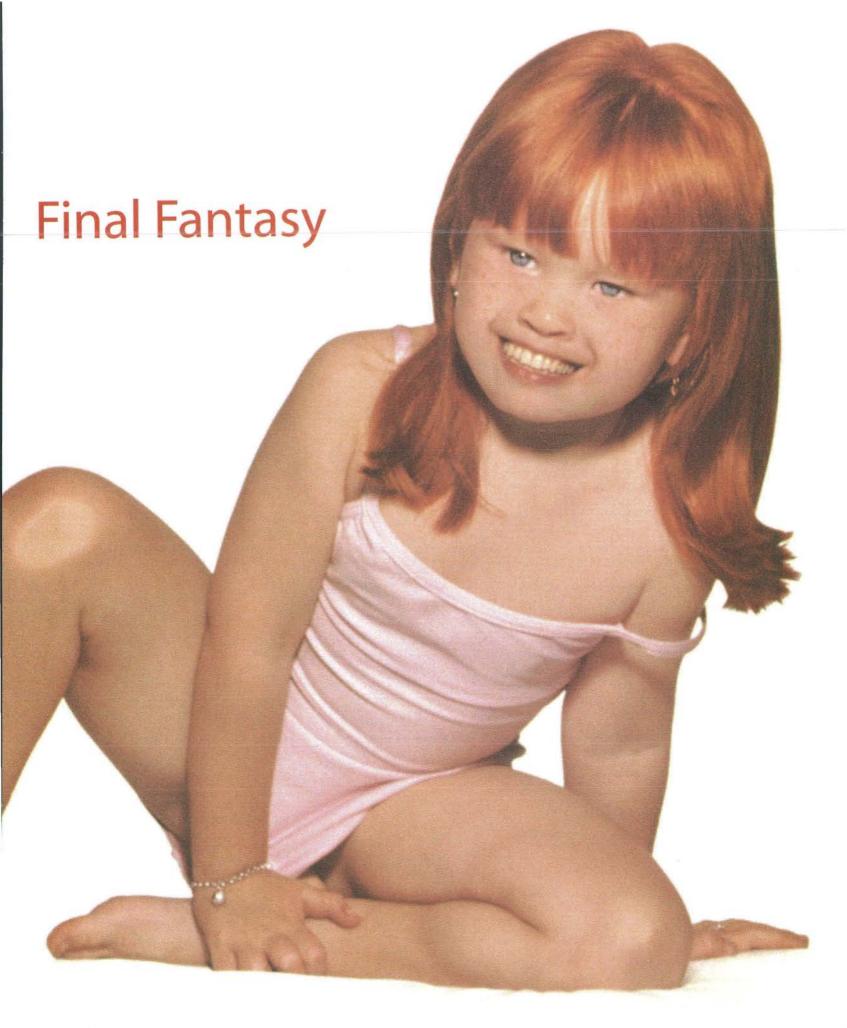
These terror tots (one of which is shown at right) hint at how we are becoming isolated by our technology as games and VR encroach further on our "real" reality – hence the series' title, from a Nintendo game. The artist's only digital manipulation was to give the girl the mouth of a man.

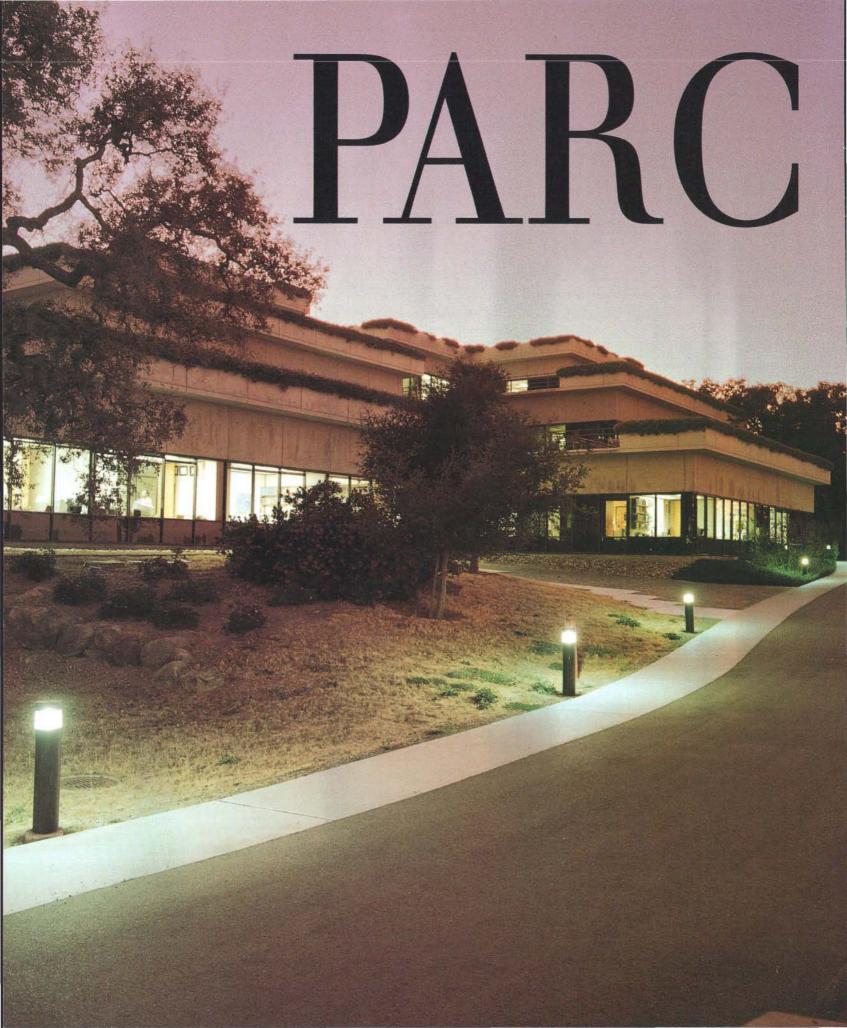
Final Fantasy questions our stereotypical views of children, and asks whether "they are somehow sacred or sacrosanct, as if the child were a symbol of innocence," says van Lamsweerde. "I wanted to ask whether we can still say kids are born innocent. In New York it was the 12- and 13-year-olds that scared me most." – Jules Marshall

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# In the early 1970s. Xerox PARC was the hottest research facility in co

In the early 1970s, Xerox PARC was the hottest research facility in computing. Their business, as they immodestly put it, was inventing the future.

And they did, including the first real personal computer, the Alto.

Too bad they also fumbled the future – while others commercialized their inventions, Xerox slipped into decline. Now PARC is back. Howard Rheingold reports on its new vision, new researchers, and amazing new technology.

n 1983, I read an article about mind-amplifying machines. These were as different from the computers of the time as television was from 15th century printing presses. The article's author, Alan Kay, worked at Xerox Palo Alto Research Center (PARC). I concluded that PARC amounted to a hive of zealots bent on changing the course of culture. I wanted in on it. Most of all, I wanted to test drive one of the devices they used to amplify their own minds.

I managed to get a job at PARC writing articles for a Xerox in-house magazine. A year before the first Macintosh computer was sold, I commuted 45 minutes to PARC's rural campus to type on an Alto - the first true personal computer. My job was to interview PARC researchers about their work. They talked about bit-mapped screens, local-area networks, point-and-click interfaces, object-oriented languages. All those futuristic experiments they showed me have diffused so widely (and profitably) during the past ten years that it is easy to forget they were once confined to that building on a oakspotted hill above Silicon Valley.

The players on the all-virtuoso team that convened then at PARC's computer labs were eager to volun-

teer as guinea pigs for the technology they wanted to build. They were dedicated to designing their own personal, networked mind-amplifiers, then handing over their creations to non-programmers for intellectual work. One phrase became PARC's hallmark: "The easiest way to predict the future is to invent it." They succeeded so well that nothing has been the same since, including PARC.

The early days of PARC are the stuff of Silicon Valley folklore. Personal computers did not spring naturally from the computer industry. They were deliberately realized by a radical fringe, against all the force of the day's accepted wisdom.

These zealous wizards handed Xerox an astounding lead in information technology in the early 1980s, but by the end of the decade, Xerox watched as upstarts like Apple and Microsoft grew wealthy off Xerox's discoveries. Neither Apple nor Microsoft even existed when the first Altos were designed in the early 1970s; by 1990 either company could have bought Xerox. The tragicomic Xerox saga is recorded in Douglas K. Smith and Robert C. Alexander's Fumbling the Future.

But Xerox hasn't always fumbled the future. The company persists because long ago it redefined itself and reinvented its business. Fifty years ago, Chester Carlson invented a scheme for printing dry photocopies of documents. Few corporations of the day were interested in an expensive, messy, unreliable way to do what carbon paper did cheaply and well. Nonetheless, Carlson's company, Haloid, committed itself to a future in which people would use office copiers for purposes unimaginable in the carbon-paper era. Renaming itself Xerox, the company championed the copiers that soon rendered carbon-paper obsolete.

Having already invented the future twice, then squandering its advantage, could Xerox still have stories to tell? In the fall of 1993, I returned to Xerox PARC for another chance to go back to the future. Where was Xerox? On the road to reinventing itself for the third time.

New, young faces populate the halls today. Video windows and audio communications are built into workstations. Desktop screens have evolved into wall-sized screens, clipboard-size screens, and pocket-size "tabs." The place is still an intellectual wonderland. Again I feel like I've dropped in on an outpost from the future. It's not just the latest gadgetry. Something's happening. The hardware and software



"JSB" to everyone, Xerox PARC director John Seely Brown hopes to redefine the corporation through a synthesis of biology, cognitive science, and hard technology.

MANOR SHOTOGRAPHON SHOTOMAN

What happens when you take the computer for granted?
Mark Weiser (facing page, top left) makes computers disappear into innocuous badges (below), smart white boards, and intelligent scratch pads (facing page, top right). Pavel Curtis (facing page, bottom left) is exploring the sense of community and new forms of



communication which are created in the virtual worlds of the Net. And PARC has not abandoned its product-oriented R&D mission: Malcolm Thompson (facing page, bottom right) has created a color display capable of representing images at a quality higher than that of paper.

shops are still cooking up new goodies, but now anthropologists and sociologists study the nature of knowledge work and the way organizations function. These scientists are as important at PARC today as are inventors of thin-film displays or engineers of RISC processors.

In the 1970s and 1980s everybody at PARC shared a mental model of the future – they predicted that millions of people would soon use screens and windows and mice, linked to high-speed communication pipelines. But now in the 1990s, nothing seems as easy to forecast or design as personal computing and networking were. This time, the folks at PARC are taking their info-tools into relatively uncharted territory – what happens among people.

Personal computers and localarea-networks are boxes of electronics, cables that transport bits. But once they are in place, the effects on organization are more powerful than number-crunching and file-transferring: People use those boxes and cables to think, communicate, and solve problems in new ways. Those new ways are not visible, but they represent the raison d'être of innovative information processing and communicating tools. These tools, after all, don't generate electrical power or material goods. Through the interaction of minds, they effect changes in human relationships, and through those, changes in organizations. This territory - what happens to people's minds and to organizations after personal computers and networks are installed - is the new terra incognita that PARC researchers are exploring. What they have discovered so far, in the earliest phases of the research, is both startling and inspiring.

#### **Postmodern Computing**

The first person at PARC I talked to this time around was Mark Weiser. I had never met this smiling, bearded fellow before, but I recognized the room he was standing in.

I sat on the same couch in the same corner office with the same view of Palo Alto ten years earlier

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when Bob Taylor was director of PARC's computer science lab. At that time, as now, PARC was a one-stop shop for everything from new microcircuits (and new ways of making microcircuits) to new computer systems and new software. Taylor had been a young administrator who led a stellar, single-minded team for more than a decade, with legendary results. Taylor and his crew were the heirs to Douglas Engelbart's crusade to "augment human intellect" at the Stanford Research Institute.

As silly as it seems today, there was a time when almost everybody in the computer industry was convinced that computers were destined solely for calculation or data processing. Engelbart, a lonely visionary, pushed the radical idea that computers could be used to extend the power of human minds to think, communicate, and solve problems this was "augmentation." There was a threshold out there, Taylor's early PARC team believed, measured in processing power, where true intellectual augmentation would take place - the way 24-frames-a-second marks the boundary between still photography and cinema.

Bob Taylor's motto had been "Build what you use. Use what you build." One of the first things Mark Weiser shared was his own interpretation of this now hoary PARC wisdom: "You let what you build change you, and you move on." In Weiser's view, PARC learns how to build better tools, and then everybody learns to use them. Then they do it all again, with the new tools. The people at PARC have a hunch that this organizational bootstrapping might be worth more to Xerox than the tangible artifacts the process produces.

The early computer science lab crew stood on a mountain, and the destination was clear. The sights of Weiser and company are more arcane – they are mapping aspects of intellectual work that have yet to be explored.

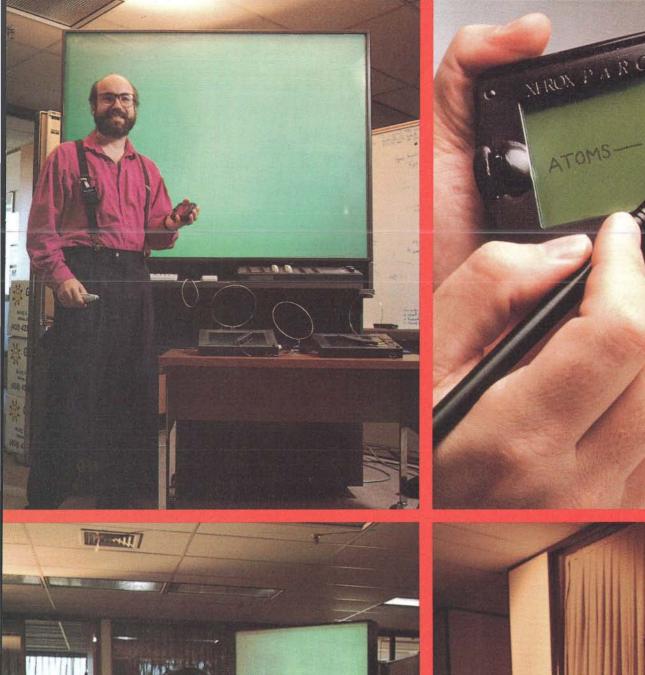
Weiser wants computers to disappear into the background. When computers become invisible to users, the most important side of human-computer symbiosis (to humans) has a better chance to

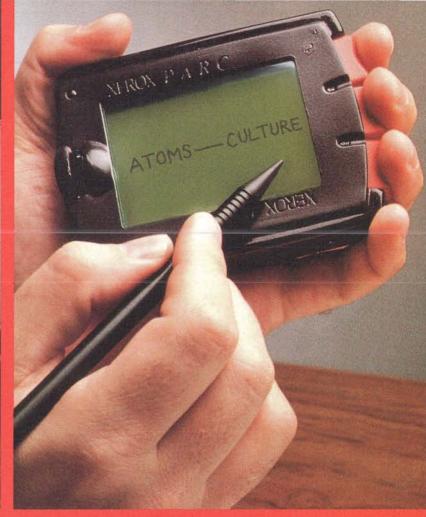
emerge. How to make them invisible? Make them ubiquitous. "Ubicomp" Weiser calls it.

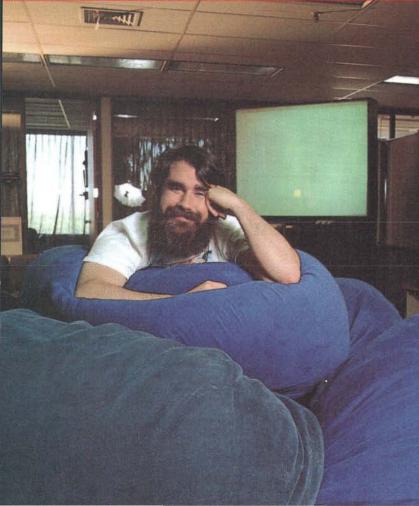
To Weiser, the intellectual origins of "Ubicomp" lie in the social rather than the technical side of PARC's research: "The idea of ubiquitous computing first arose from contemplating the place of today's computer in actual activities of everyday life," he writes in a recent paper. "In particular, anthropological studies of work life teach us that people primarily work in a world of shared situations and unexamined technological skills. However, the computer today is isolated from the overall situation and fails to get out of the way of the work."

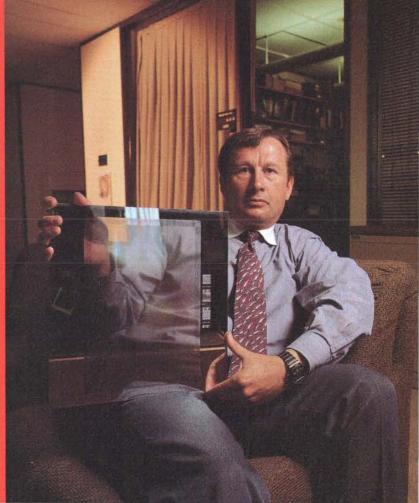
In Weiser's cosmology, the original "desktop" graphical user interface does not go far enough to get out of the way of the user. Interfaces don't do the job. Neither do agents. And certainly not virtual reality (VR). Weiser writes: "In its ultimate environment, VR causes the computer to become effectively invisible by taking over the human sensory and affector systems. VR is extremely useful in scientific visualization and entertainment, and will be very significant for those niches. But as a tool for productively changing everyone's relationship to computation, it has two crucial flaws. First, at the present time [1992], and probably for decades, it cannot produce a simulation of significant verisimilitude at reasonable cost. That means that users will not be fooled and the computer will not be out of the way. Second, and most importantly, it has the goal of fooling the user - of leaving the everyday physical world behind. This is at odds with the goal of better integrating the computer into human activities, since humans are of and in the everyday world."

Embedding intelligence in the environment is not possible with present-day technology, so Weiser's group started with wall-sized interactive screens known as "boards," clip-board-sized terminals known as "pads," and tiny computers called "tabs." The first stages of Ubicomp bootstrapping incorporated another innovation, first created by Olivetti's research center in Cambridge, Eng-









land – an "active badge." With an active badge system, every computer you sit down at is your computer, with your custom interface and access to your files, because your active badge sends it information via infrared signals. It is possible to track the locations of other researchers at all times by central monitoring of active badges – a handy tool with Orwellian implications.

In his office, Weiser drew a horizontal line. The far left side he labeled "atoms"; the far right side, "cultures." PARC, Weiser points out, directs research at every part of the spectrum defined by the line between atoms and cultures: Toward the "atom" end of the line is PARC's ongoing exploration of the nature of materials. Toward the center lies PARC's work in turning materials into real hardware products. Smack in the middle is the task tackled by

PARC teams are way beyond "fumbling the future." They are inventing the future again. But this time they are reinventing their understanding of how to invent the future, as well. There is a sense that they are onto something new, that instead of extending the old computer revolution into new widgets and gadgets, they are at the dawn of a whole new – and potentially scary – revolution.

PARC is an intellectual playground, full of free spirits. How do they feel about the possibility that Ubicomp might lead directly to a future of safe, efficient, soulless, and merciless universal surveillance?

"Some people refuse to wear badges," Weiser says. "I support their right to dissent. And one principle we go by here is to maintain individual control over who else sees anything about us....The answer will have to be social as well as technical."

The hardware and software shops are still cooking up new goodies, but now anthropologists and sociologists study the nature of knowledge work and the way organizations function.

Taylor and his group, integrating hardware and software design into information systems. And toward the right, closer to "cultures," are systems and practices – the hunting grounds of social scientists.

The lab's new direction, Weiser says, "recognizes even more that people are social creatures." He referred to his ideas as a form of "postmodern computing," in that he wants to "return to letting things in the world be what they are, instead of reducing them" to data or virtualizing them into illusions. "Ubicomp honors the complexity of human relationships, the fact that we have bodies, are mobile," he said. Tabs, pads, boards, and badges are the first bootstrapping steps in that direction, not the long-term goal. Nevertheless, part of that environment has migrated into productland and is embodied in the "LiveBoard" (see Wired 1.4, page 36).

#### Corporations as MUDs: The Virtual Water Cooler

When computers disappear into the woodwork, people in organizations will do the same important thing people in organizations have always done: They will tell each other stories. While workstations can amplify the work people do in their physical cubicles and formal job roles, boxes on desks can't approach what happens at the water cooler. One PARC researcher, Pavel Curtis, is looking closely at MUDs, the water coolers of the Internet. He sees them as a way of bringing informal, even playful communication back into organizations. In MUDs, the "Multi-User Dungeons" of the Internet, thousands of enthusiasts create their own dramatic adventures, sometimes vying for points in fantasy games, sometimes just conversing.

Curtis had been working on a new programming language when he

became interested in MUDs, precisely because the newest generations of MUDs were not just fantasy worlds, but tool kits that the players used to create programs to enhance their fantasy-narrative games. MUDs were evolving into group-programming languages.

Why not make a MUD programming tool kit that was also an example of another honored PARC tradition, an object-oriented language? From such a language comes MOO, or "MUD, Object-Oriented." Curtis built on the work of Steven White, a student at the University of Waterloo (Canada). In January 1991, he opened LambdaMOO. Hundreds of players flocked to it.

In his office, beyond the screenpad-tab-strewn atrium outside Weiser's office, Curtis describes being "drawn back into serious MOO research. In 1992, I dropped the other research and started studying MUDs." MUDs as "social virtual realities" had become his personal passion. That passion grew into the Social VR project, in collaboration with Dave Nichols.

PARC began taking MOOs seriously. Weiser actively encouraged MOO research at the computer science lab as a natural adjunct to Ubicomp - both are ways of exploring the informal dimensions of computeraided communication. Curtis and Nichols simultaneously looked for useful applications - a MOO for astronomers to meet via the Net and share data, including graphics and started thinking about bigger issues, like multimedia interfaces and whether the medium can be scaled up for millions of participants. "What else is a MOO good for, besides playing games? What are the nonrecreational uses? Could a virtual office be a useful tool for effective telecommuting?" were the questions they started pursuing.

PARC researchers had been experimenting with multimedia conferencing, including video and audio, in Palo Alto and at a sister organization, EuroParc, in Cambridge, England. What would be required to add video to a MOO?

Curtis envisioned Project Jupiter, a multimedia MOO, to include a suite

of tools for creating collaborative environments quickly. Users would modify their virtual collaboration space, creating a unique arena for each project.

We sat in front of Curtis's color screen, looking at surprisingly highquality video as part of his computer display. He showed me how a multimedia MOO would work. Every space within the virtual world would be a place where people could display text, bulletin-board style. But people who were present in the same virtual room, no matter where they were in the physical world, could choose to be in audio and video contact. A researcher in one part of the building, or one part of the world, might encounter another researcher in one of the MOO's "rooms." A simple command would make it possible for those researchers to see each other via video and talk with each other via audio connections built into their computer workstations.

A collaboration space that mutated from role-playing games is a long way from copying machines, or even the electronic office, but it is easy to see Curtis's work as part of a whole strategic vision of tapping people's everyday innovations.

#### Management by Storytelling

John Seely Brown, Xerox VP, director of PARC, and "JSB" to everyone, came from the cognitive sciences, not the hardware, software, or telecommunications world. He's setting PARC's sights on a bigger target than electronic offices or even information architectures – seeking to reconfigure the modern corporation. As he wrote in the *Harvard Business Review* in 1991, "The most important invention that will come out of the corporate research lab in the future will be the corporation itself."

JSB, at PARC since 1978, is informal, lanky, bearded, and possessed of a Mephistophelean grin. He's both loose and intense, and came at me from some unexpected directions. His work makes clear that PARC doctrine today is grounded in an intellectual foundation combining aspects of biology, anthropology, organizational and literary theory, along with the ideas of tradition-

al physics, engineering, software and systems, and cognitive science. He envisions a new, dynamic ecology of communications – rather than a static architecture of information.

True to his precepts of informal communication, JSB met with me at a restaurant. Over spinach salad and a view of Palo Alto's University Avenue, we plunged directly into the future of Xerox.

"Co-evolution" and "narrative" were two words JSB emphasized when asked to describe the new organizations he envisions. In 1992, he wrote: "In the past, our emphasis has been on the individual, and most of our tools were aimed at enhancing the effectiveness of the individual mind. In the future, the action will be in leveraging the organizational mind." When we talked about PARC's future, he began by speaking about webs of human relationships, about the organizational mythologies, legends, and fables that bind groups across formal boundaries.

"Companies no longer assemble products so much as they make meaning out of the world," he said.

The narrative device in the latest PARC scenario is the technique known to screenwriters as "the reversal." Anthropologist Lucy Suchman started studying Xerox accounting clerks in 1979. When she interviewed the accounting clerks, the answers they gave her about how they performed their work corresponded to the procedures described formally in their job descriptions. When she applied ethnographic observation, Suchm an discovered that the clerks relied far more, as JSB described it in the Harvard Business Review, on a "rich variety of informal practices that weren't in any manual but turned out to be crucial to getting the work done.... Without being aware of it, they were far more innovative and creative than anybody who heard them describe their 'routine' jobs ever would have thought."

Suchman's work reveals that even people who do mundane jobs are constantly innovating. But the institutionalized values of almost all organizations force people to hide their innovation. Encouraging the informal practices that people develop within organizations humanizes organizations, and it also taps the hidden power of everyday innovation.

JSB foresees PARC in the center of a revolution, not just in information products but in technology design and production. Researchers and customers, companies and citizens, will coproduce technologies.

Now that we know how to build tiny machines that can amplify our thinking, let's dissolve them into the countertop, the desktop, the hallway, says Mark Weiser. Let's find ways to facilitate informal, imaginative communication among coworkers by harnessing the narrative form that can cause MUD addiction, says Pavel Curtis. As the technology disappears, let's fill the space it leaves with storytelling, says JSB. Personal computers and computermediated communication offer ways for people to think about ideas and procedures, and to communicate with one another.

The innovations that emerge from that computer-aided thinking are more valuable to organizations than the hardware that helped individuals come up with them. The relationships between people in organizations are more important than the hardware and software that makes it easier for them to communicate. Using computerbased tools in an atmosphere that fosters storytelling, improvisation, and informal communication is a way of harnessing silicon to amplify the powers of minds and working communities. "A new transparent knowledge medium that supports communities of learning and workers - a medium which helps us help each other," as JSB puts it.

The importance of storytelling surprised the social scientists on the PARC team. Another anthropological study examined service technicians in training at a large corporation and out in the field with customers. The reps in the study relied on a rich repertoire of informal tricks absent from the procedures manual. In formal training, reps are taught to trouble-shoot in an efficient, algorithmic manner. In the field, reps

construct a story that makes sense of the diagnostic data – they spin a narrative that explains the symptoms. While they run the machine through all the standard diagnostic tests, they tell each other stories. From the stories, solutions emerge.

Reps and local operators - and the networks of people they each bring to the dialogue - use stories to communicate about solutions to their problems: stories of weird error messages of the past; stories about buddies of theirs who had debugged a problem like this one a month ago. Not only did the front-line workers in organizations innovate to solve their own problems and save their own companies from their own procedure-manual illusions, they created an invisible, informal, potentially immortal knowledge-base of solutions in the form of stories.

Lasked JSB about his belief that tomorrow's successful companies will be "knowledge refineries." JSB talked about the many ways we all improvise every day to enable us to work around the limits of space, time, and technology. He wants to use PARC to tap that as yet unexplored innovation power. JSB is convinced that information technology can be used to help people achieve more of their innate potential. But simply implementing new hardware and software systems isn't enough. "You have to change the way people think about working, learning, and innovating," JSB cautions.

If the ephemeral understanding of how work practices change with new technologies becomes Xerox's "product," rather than boxes or bits, where is the company's competitive advantage? JSB believes that if they are right, Xerox will redefine itself radically. "To the root," JSB reminds me, is the original meaning of "radical."

PARC's success in the 1970s has indirectly bred questions in the 1990s – about social control of technology, risk assessment, ethical guidelines for using technologies affecting privacy. Dwelling on the big, soft questions – the messy waste products, the effects on our psyches, communities, and biosphere – may or may not spark a spectacular marketplace win, but there's a palpable sense at PARC that

it's the right thing to do.

As they look at cultural phenomena, PARC scientists and engineers have not abandoned their commitment to integrated research into fundamental principles and components. Xerox was instrumental in establishing the United States Display Consortium, a cooperative venture to recapture from Japan the technological lead in flat-panel video display technologies. A new active-matrix liquid crystal display has led to a prototype of the highest-resolution screen in the world at PARC. Malcolm Thompson's new color display screen, with 6.3 million pixels, makes possible an extremely high level of visual representation as good as or better than paper.

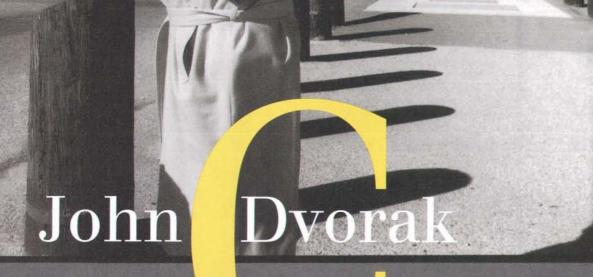
So how will PARC guarantee that this time they won't fumble their new future? Three ways, says JSB. "One, we are more careful about intellectual property. Two, we are working smart – looking for entrepreneurial partnerships to develop ideas quickly. And three, Xerox has radically repositioned its organization so that its corporate strategy is shaped and informed by PARC and PARC is being shaped and informed by corporate strategy."

JSB serves as chief scientist for all of Xerox, relaying PARC's inventions and potential to the rest of the company. "In the old days we threw inventions over the transom to the business divisons. Now it's more like co-evolution."

Boxes and bits - informationprocessing and communications hardware and software - will still go out the door, as Xerox continues to convert PARC inventions into products. But some ideas might end up as PARC's most influential innovations. If JSB is right, PARC might end up swallowing Xerox, in a new paradigm of ontological management processes that is only dimly imaginable today. Will our organizations end up as rigid tyrannies, with "human factors" designed to conform to technologies? Or will we coproduce more humane organizations, more innovative and more fulfilled humans? It's time for communication technologies to be designed with those questions in mind.

An occasional insider's look at the digerati.

By Paulina Borsook



rofessional maverick. True. Trades on being the computer-journalist equivalent of the kid who makes snarky remarks in class, but because he makes the teacher laugh too, isn't sent to the principal's office. MacUser Editor in Chief Mag-

gie Cannon, who first hired John C. Dvorak at Infoworld in 1981, says he "pioneered three-dot computer journalism and has the Rush Limbaugh/Howard Stern image people love to hate." Still, PR specialist Andy Cunningham says that Dvorak is "a lot more reasonable than his image, and if he's caustic, it adds to his career." His irreverence and bad attitude don't subvert the dominant paradigm enough to cost him the hundreds of thousands of dollars per year he pulls in through his Ziff-Davis-based publishing sinecure. Dvorak considers Infoworld's Robert X. Cringely his only true computer-columnist competitor, meaning Cringely also takes a stand of critical distance on the computer industry. Some sources maintain the two writers share other traits, such as journalistic sloppiness, mendacity, and nastiness.

Doesn't write his own columns. Iffy. Called by more than one source the Mark Kostabi of computer columnists, John C. Dvorak says he writes all 17 of the columns he turns out each month, an attainable feat, he asserts, because the wordcounts average out to 500 per day. Wife Mimi is also a collaborator. Probably more a matter of semantics than anything else; depends on how you define "research" as provided by assistants and what it means to "write" a column. Not clear whether he follows the Andy-Warhol-inspired m.o. of having underlings do production that the celeb merely stamps his name on, or if the less venal model of the atelier of a Netherlandish master would apply. There, apprentices did variable amounts of the filling in of canvases, but the master at worst gave everything at least a once-over to make sure that everything leaving the studio had the proper look and feel - and at best, as time permitted, turned out authenticated originals.

Goes for the gold. True. Fellow PC Computing editor Paul Somerson says that John C. Dvorak is a "great packager of himself, and no one else has the stature [in the computer industry] of his instant name-recognition." Has appeared on Larry King Live several times and has had syndicated weekly radio programs. Turns out books where chapters are largely written - and donated - by vendors. Once turned out an advertorial for Barron's where he asked PR firms to ghostwrite white papers for free, with the material then OCRscanned into his computer and cleaned up. Clearly into writing for the money, his next venture may involve the creation of airport novels. Admires Danielle Steele's use of structure. To avoid California taxes, recently bought a former timberbaron mansion replete with indoor swimming pool overlooking Washington State's Straits of Juan de Fuca - ironic because, according to San Franciso Examiner publisher Will Hearst, the Walter Winchell of computer journalists has famously trashed Seattle as "the stupidest city in America."

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Turns traditional journalistic ethics on their head. True. Once posed for a print advertisement for now-bankrupt Everex Computer Systems, but only accepted a standard modeling fee for the gig. (The ads, however, ran for months on the pages near his columns for *PC Magazine*.) Routinely goes on junkets paid for by computer vendors or trade associations; defends junketeering by saying that it gives him greater exposure to the wide wicky-wacky world of computing, thus enabling him to make more informed judgements about products and technologies. The horror other journalists express at his junkets may be in part jealousy (he can get away with breaking the rules and they can't) and part the pot calling the kettle black (computer journalists routinely engage in kindred ethically questionable practices such as taking speaker's fees, consulting, or having vendors pick up

Performance artist. True. Hangs with comedians; former rival-columnist and current Infoworld Editor in Chief Stewart Alsop says people "read Dvorak's columns for their entertainment value. How often he's right is not the key issue." Said to use French Catholic philosopher Jacques Ellul's Technological Society as a guide for turning himself into a Coyote-Trickster who profits from the computer industry's media carnival. Used to put on insider/A-list/no-marketers-allowed parties at Comdex, paid for by Will Hearst. Now acts as a show pony for Ziff-Davis' own Comdex parties.

the dinner tab).

Arrogant and bullying/humble and charming. Both. Back in the mid-1980s wrote a column explaining why the Macintosh wouldn't sell; a few years later revisited the topic, explaining why the Macintosh *did* take off. While he may be provocative for the sake of being provocative, Dvorak will go back on the record to admit mistakes. Technically informed (took college-level classes in programming, in the 1970s was involved in early personal-computer companies) and maintains a network of astute technical contacts as backup for his opinions. The amount of hardware and software arriving daily at his house for review is said to require a forklift.

**Epicurean.** True. Can always get a table at overbooked Bay Area foodie reliquaries such as the Cafe at Chez Panisse or Greens. Used to write about wine before he became known as a computer journalist. Bill Machrone, vice president of technology for Ziff-Davis, says "it's common knowledge that when John chooses the wine and food, it will cost a lot." The ire in probably his most infamous column, "My Dinner with IBM," came as much from IBM's choice of a stodgy, overpriced restaurant and its PR woman refusing to pick up the check as it did from his outrage at IBM's reported contempt for computer users and the press.

Inspires fear and loathing. True. All manufacturers of computer hardware or software repeatedly contacted for this article maintained radio silence. John C. Dvorak reduces some journalists and PR people to spluttering incoherent rage − or cowering − all off the record. And bad things happen to people who refer to him as other than John C. Dvorak in print. ■ ■ ■

# OF MAO BELL

OR

# DESTROY THE USERS ON THE WAITING LIST!

BY NEAL STEPHENSON

The Chinese were born to hack.

A billion of them are using new technology to create the fastest growing economy on the planet.

But while information wants to be free, do they?

Neal Stephenson, author of Snow Crash, reports from South China on Market Leninism in the Shenzhen economic zone.

In the inevitable rotating lounge atop the Shangri-La Hotel in the Shenzhen Special Economic Zone, a burly local businessman, wearing a synthetic polo shirt stretched so thin as to be semitransparent, takes in

the view, some drinks, and selections from the dinner buffet.

He is accompanied by a lissome consort in a nice flowered print dress.

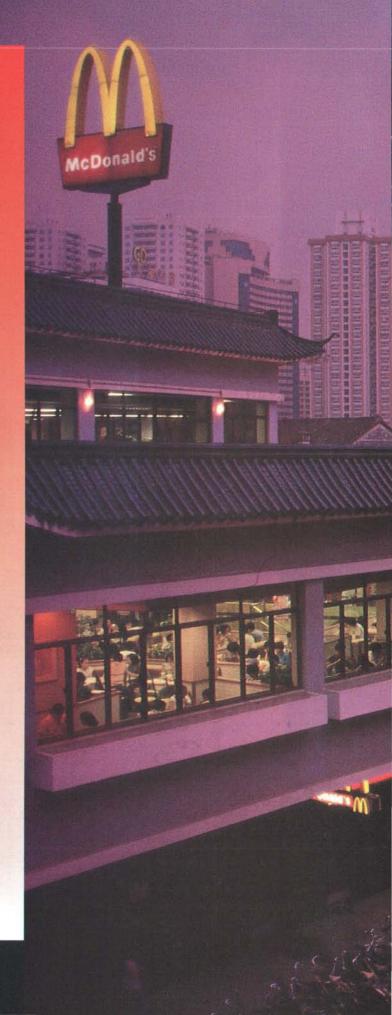
Like any face-conscious Chinese businessman he carries a large boxy cellular phone. It's not that he can't afford a "prawn," as the newer flip phones are called. His model is prized because it stands up on a restaurant table, antenna in the fully erect position, flaunting the owner's connectivity – and in China, connections are everything.

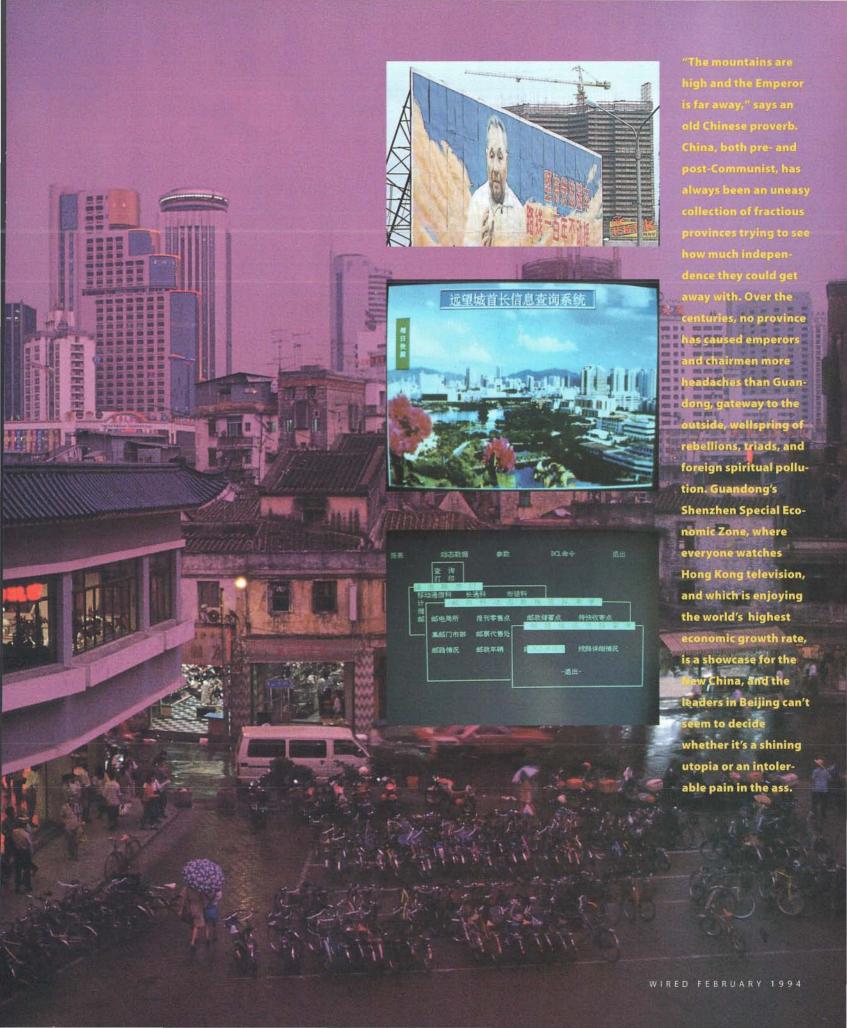
The lounge spins disconcertingly fast -

you have to recalibrate your inner ear when you enter, and I half expect to see the head of my Guinness listing. Furthermore, it is prone to a subtly disturbing oscillation known to audio engineers as wow. Outside the smoked windows, Typhoon Abe is gathering his forces.

Shenzhen spins around me, wowing sporadically.

**Photos by Paul Lau** 





Thirty-one floors below is the Shen Zhen (Deep River) itself, which separates China-proper's Special Economic Zone from Hong Kong and eventually flows into the vast estuary of the Pearl River. The boundary serves the combined functions of the Iron Curtain and the Rio Grande, yet in cyberspace terms it has already ceased to exist:

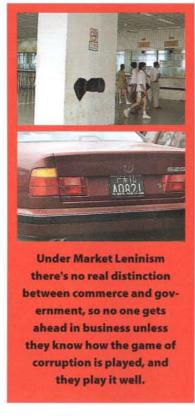
- The border is riddled with leased lines connecting clean, comfortable offices in Hong Kong with factories in Shenzhen, staffed with nimble and submissive girls from rural China. Shenzhen's population is 60 percent female.
- The value of many Hong Kong stocks is pegged to arcane details of PRC government policy, which are announced from time to time by ministries in Beijing. For a long time, the Hong Kong market has fluctuated in response to such announcements; more recently, the fluctuations have begun to happen hours or days before the policies are made public.
- · Hong Kong television is no longer targeted at a Hong Kong audience; it is now geared for the 20 million people in the Pearl Delta - the 80-mile-long region defined by Guangzhou (Canton) in the interior, Hong Kong and the Shenzhen SEZ on the eastern bank, and Macao and the Zhuhai SEZ on the western bank. Thickets of television antennas, aimed toward Hong Kong, fringe the roof of every Pearl Delta apartment block. Since TV Guide and its ilk are not available, Star TV regularly flashes up a telephone number bearing the Hong Kong prefix. Dial this number and they will fax you a program guide. This is easy for Shenzhen residents, because...
- Every telephone in Shenzhen has international direct dial.

he first thing that happened during Jaruzelski's military coup in Poland was that the narcs invaded the telephone exchanges and severed the trunk lines with axes, ensuring that they would take months to repair. This and similar stories have gotten us into the habit of thinking that modern information technology is to totalitarianism what crosses are to vampires. Skeptics might say it's just a coincidence that glasnost and perestroika came just after the photocopier, the fax, and the personal computer invaded Russia, but I think there's a connection,

and if you read Wired, you probably do too. After all, how could any country whose power structure was based on controlling the flow of information survive in an era of direct-dial phones and ubiquitous fax machines?

Now (or so the argument goes), any nation that wants a modern economy has to have information technology – so economic modernization will inevitably lead to political reform, right?

I went to China expecting to see that process in action. I looked everywhere for hardy electronic frontierfolk, using their modems and fax machines to push the Communists back into their holes,



and I asked dang near everyone I met about how communications technology was changing Chinese culture.

None of them knew what the fuck I was talking about.

I was carrying an issue of Wired so that I wouldn't have to explain it to everyone. It happened to be the issue with Bill Gibson on the cover. In one corner were three characters in Hanzi (the script of the Han Chinese). Before I'd left the States, I'd heard that they formed the Chinese word for "network."

Whenever I showed the magazine to a Chinese person they were baffled. "It means network, doesn't it?" I said, thinking all the warm and fuzzy thoughts that we think about networks.

"Yes," they said, "this is the term used by the Red Guards during the Cultural Revolution for the network of spies and informers that they spread across every village and neighborhood to snare enemies of the regime."

See what I mean? Same idea, different implementation.

Our concept of cyberspace, cyberculture, and cyber-everything is, more than we care to realize, a European idea, rooted in Deuteronomy, Socrates, Galileo, Jefferson, Edison, Jobs, Wozniak, glasnost, perestroika, and the United Federation of Planets. This statement may be read as criticism by people who like to trash Western culture, but I'm not one of those. For a Westerner to trash Western culture is like criticizing our nitrogen/oxygen atmosphere on the grounds that it sometimes gets windy, and besides, Jupiter's is much prettier. You may not realize its advantages until you're trying to breathe liquid methane.

CNN has been running ads for an American company that had been doing business in China – one of those nauseatingly self-congratulatory numbers we saw so much of after the fall of the Iron Curtain. The ad shows us exotic temples, mist-shrouded mountains, twangy music, adorable children. It's so effective that whenever I see it I have to get out my Tiananmen picture book and take a look at the picture of the Chinese prodemocracy student lying in a fetal position, his brains sprayed across the pavement by a tank that ran over his head.

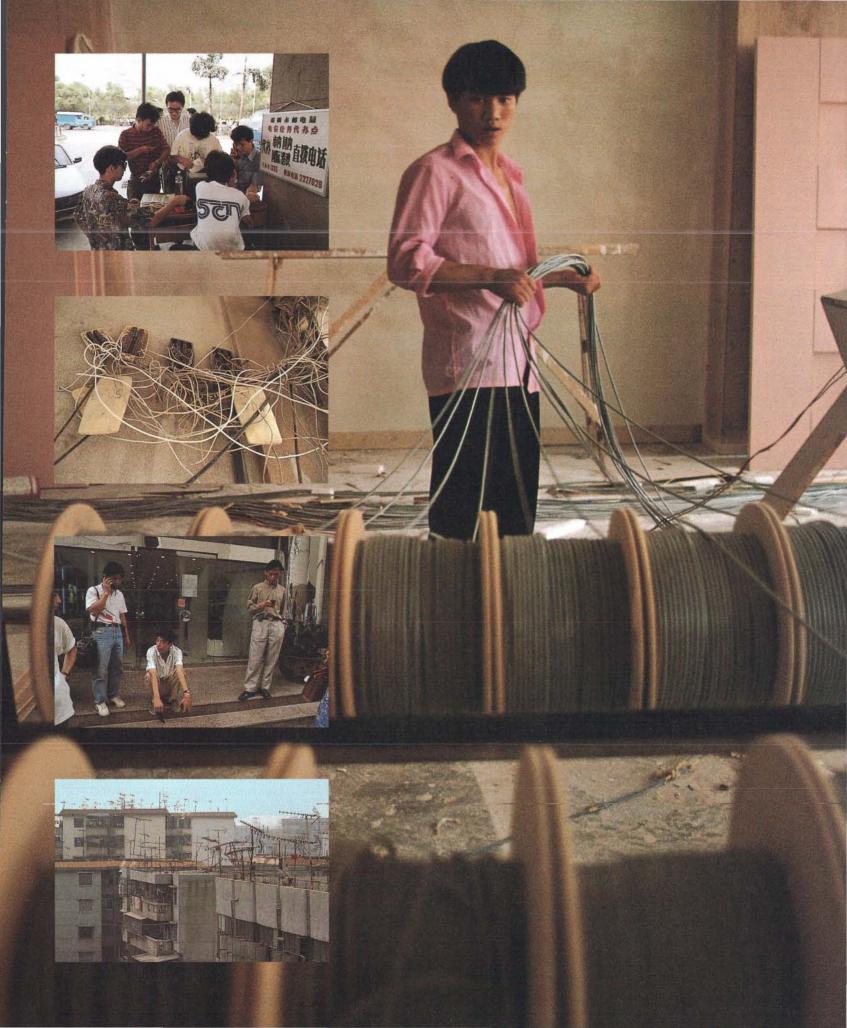
There is a common Western assumption that China is taking an economic path to a more open society, and in large part it's based on the cultural biases of people who remember Leonard Bernstein conducting Beethoven's 9th at the Brandenburg Gate and who reckon that the same thing must be going on in China. These people like to say that China's trying to emulate South Korea or Singapore. But I'd say Haiti or Guatemala is more like it.

This article is the result of a two-week trip to Hong Kong, Shenzhen, and Shanghai during September '93, during which I tried to get some sense of how the Chinese perceived the influence of technology – particularly digital technology – on their culture.

The answer is that this issue hasn't

The Chinese don't seem to be hampered by technophobia and adopt new technology more rapidly than anyone - especially if it has anything to do with communications. The big photo was taken in the operations center of Shenzhen's largest pager company, where a couple of hundred new operator cubicles were being hastily patched into the grid. Insets: Every working telephone gets hauled out to the street where it becomes a thriving business. Improvised phone wiring hangs from the walls of apartment buildings. Owners of short-range CT2 phones - "poor man's cellular" hang out in the vicinity of base stations to make calls, and every domicile - whether it's a new apartment or a rural shack - has its own TV antenna pointed south

toward Hong Kong.





occurred to the Chinese yet, and probably never will, because it basically stems from a Western, post-Enlightenment perspective. Going to China and asking people about the Hacker Ethic is like going to Peoria and talking to the folks down at Ned's Feed & Grain about Taoism. The hacking part comes to them easily enough – China is, in a sense, a nation of analog hackers quickly entering the digital realm. But I didn't see any urge to draw profound, cosmic conclusions from the act of messing around with technology.

henzhen has the look of an information-age city, where location is basically irrelevant. Unlike, say, Shanghai (which is laid out the old-fashioned way, on an armature of heavy industry and transportation lines), Shenzhen seems to have grown up without any clear central plan, the office blocks and residential neighborhoods springing into being like crystals from a supersaturated solution. Think of the difference between Los Angeles and New York City, and you might get a general idea of what I mean. Streets tend to be straight, wide, and many-laned, with endless iron fences running down the middle so that pedestrians and bicyclists are forced, against all cultural norms, to cross only at major intersections. Shenzhen has more cars and fewer bicycles than most Chinese cities. This has shifted the balance of power somewhat; in, say, Shanghai, mobs of bicyclists play chicken with the cars and frequently win. But in Shenzhen they stand defeated on the curbs, waiting for the light to change. Occasionally some young scoundrel will dart out and try to claim a lane and be driven back by taxi drivers, scolding him with horns and shaking fingers.

Even on a humid day (which is to say, every day) the place is rather dusty, like a construction site where things haven't been tamped down yet. Houses are rare, though there is one district that looks something like an American suburban housing development, albeit more tightly packed. But this one looks like it's been abandoned and then recolonized by survivalists: Every house is surrounded by a high wall topped with something sharp, and if you peer between the iron bars of the gates, you can see that the windows and patio doors of the houses are additionally protected by iron bars and expanding metal security gates.

Beyond that, everyone lives in high-rises.

On every block in central Shenzhen, clean new high-rises protrude from organic husks of bamboo scaffolding. Nissan flatbed trucks rumble away from the waterfront stacked with sheets of Indonesian mahogany plywood on its way to construction sites, where it will be used in concrete forms and then thrown away. The darkness is troubled by the report of nocturnal jackhammers, and allnight arc-welders hollow immense spheres of blue light out of the translucent, steamy atmosphere.

Only a quarter mile away from this



scene of hysterical development, a green hillside rises, covered with an undisturbed mat of tropical vegetation and empty except for an ancient cemetery. It doesn't make sense until you realize that you're looking across the Shen Zhen into Hong Kong territory. Running parallel to the river is a border defense system meant to keep the mainland Chinese out. A chain of sodium-vapor lamps and a high fence topped with razor ribbon cuts across lakes and wetlands that have become wildlife refuges by default.

The population of Shenzhen is 2.6 million. Thirteen years ago it was two thousand. The growth rate of Guandong Province, which includes the Pearl River

Delta, is the highest in the world.

It would be a lot higher if not for the Second Border that separates the Special Economic Zone from the rest of China. When you're leaving Shenzhen you simply cruise through a chute without stopping. When you recross the Second Border on your way back, it's a different story.

The highway broadens into a vast slab of pavement covered with fine red dust from the Pearl Delta's devastated hill-sides. You and all other passengers have to bail out and pick your way hazardously through traffic until you've reached the border station.

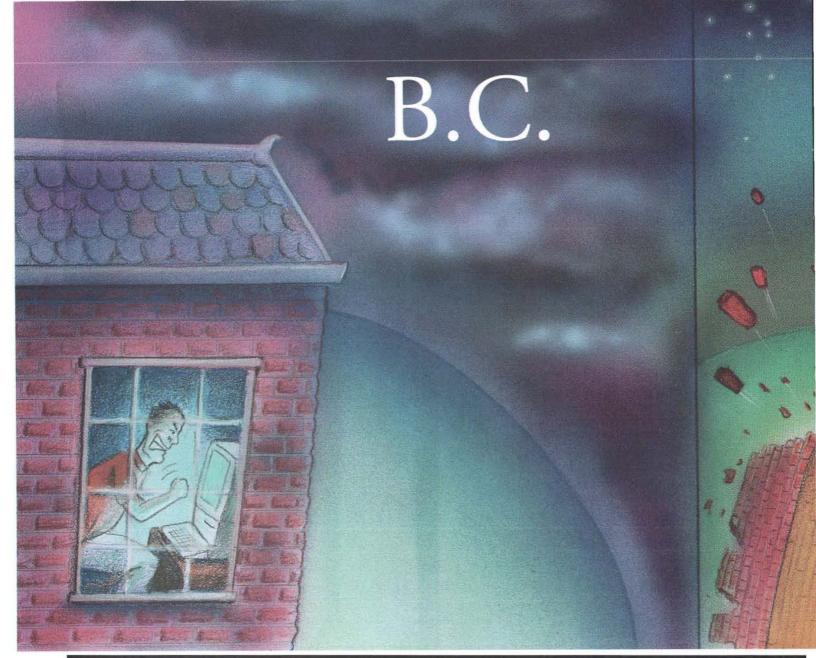
Here you are funneled through one of many parallel lanes and checked out by a man in a uniform. If you're a Westerner, they don't even bother to look at you. If you look Chinese, you may have problems. A non-Chinese passport will get you through, of course, unless it's a British passport from Hong Kong; since the PRC doesn't recognize the legitimacy of Hong Kong, such people have to get a special document that serves the function of a passport inside the PRC.

If you are mainland Chinese, you don't get through unless the government has given you permission to live in the Special Economic Zone. Generally, such permission is only given to the young and college-educated. So Shenzhen has its own corrugated shantytowns of illegal immigrants, sitting in plain sight next to major highways, in the occasional patch of land that hasn't been covered with high-rises or factories yet. Apparently the Shenzhen authorities have the same schizophrenic attitude to the illegals that many Germans do – they're tolerated as long as they're convenient.

Many Shenzhen residents would, of course, love to get across the river into Hong Kong, which has its own such neighborhoods. And many residents of Hong Kong are scrambling to get passports from Canada, the US, or the UK. Once they've secured non-PRC passports, they frequently come back to Shenzhen to start and manage businesses, staying in luxury condos built specifically for them by the city fathers. Seen through all these concentric barriers, the Overseas Chinese (ethnic Chinese returning to their homeland) must seem infinitely remote to the peasants being turned away at the Second Border. Locals call them the "spacemen."

Shenzhen is touted as an exper-128 ▶

Ever since the Opium Wars, when the Chinese were shocked by the military prowess of puny Western nations, they have been at pains to acquire foreign skills while leaving foreign ideas stranded at the border. It worked with the bicycle and the H-bomb, but will PCs and packet data networks bring an unstoppable influx of troublesome Western political ideas along with them? The crackdown has already begun, but it's hard to tell how much is a real cultural backlash and how much is just a turf war between rival departments of the Chinese government struggling for control of what will eventually become the world's largest telecommunications market.



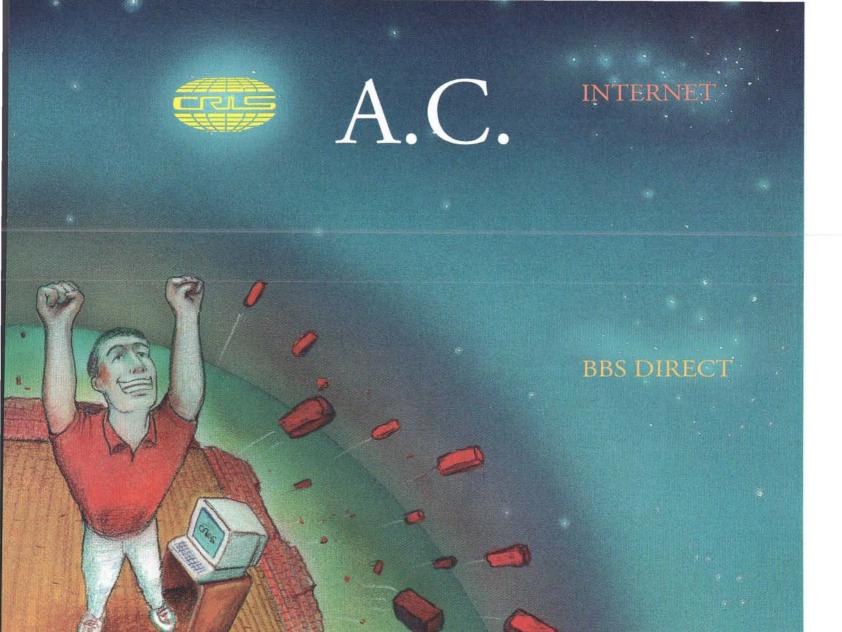
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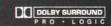


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# STREET CRED

# The Lenny Bruce Performance Film

enny Bruce pretty much invented what we think of as modern comedy. Richard Pryor couldn't have made it if Bruce hadn't come before him. Neither could Robin Williams, George Carlin, or Stephanie Hodge.

On the face of it, what Bruce did was very simple – he talked about his life, what he saw on the street, and what he read in the papers. What was different about Bruce's approach was he didn't soften the focus. When talking about sex, for instance, Bruce refused to make it something juvenile, cute, or safe. He tackled subjects that weren't talked about on nightclub stages in the mid-1960s – drugs, homosexuality, race problems, and religious hypocrisy. And he



Here's the trial evidence. You decide who's obscene.

talked to his audience as an equal, using such ordinary (but at the time forbidden) language as "tits and ass" and "cocksucker." For that he got busted.

This 1965 performance is not Bruce at his peak, but his power is still obvious. The film is the only full-length performance he ever recorded on video. It was a way to preserve his real act – and not the act as reported by the press – intended as evidence in one of his obscenity trials. If you care about free speech or are bored silly by the parade of Andrew Dice Clayclones spitting obscenities and calling it social commentary, take a look at this video from a time when comedy was dangerous. – Richard Kadrey

The Lenny Bruce Performance Film: US\$19.95. Rhino Video: (800) 432 0020, +1 (310) 474 4778.

# Cancel My Appointments - 'til the Year 2000

imCity taught me a couple of things. One, there is no action without consequence: no industrial growth without pollution, no higher taxes without a dip in the polls. Two, there is a whole real world outside my simulated city, where you just can't turn off all disasters and set game speed to slow – it's where I live when I'm not playing SimCity. Now Maxis has released SimCity 2000. Try not to let that annoying little thing called your life interfere with playing it.

Like the original (now selling as SimCity Classic) you have a budget, some land, and equipment and supplies to build on it. The game's simulation algorithm uses your actions as input to calculate property values, pollution levels, population expansion, crime rates, business growth, your mayoral rating, and even little things like the citizens' (called Sims) happiness. Everything is connected to everything else in SimCity's algorithm. For example, heat, high crime rates, and unemployment cause riots; good economies, low crime rates, and education prevent them. Riots cause fires, which are aggravated by a poorly funded fire department. Firefighters are good at controlling fires but can be wiped out by rioters; police are good at controlling riots but can get





SimCity 2000: Clamoring citizens will run lame mayors out of town.

toasted in a fire. Police stations lower the crime rate and help raise the land value in a circle around each station. High land value boosts local commerce, commerce creates jobs, jobs increase population.

SimCity 2000 has enough new features to justify readdiction. Now, time itself becomes a factor: As new technologies, such as desalinization and fusion power, are invented, the tools to use them pop up in your toolbox. The terrain (completely editable) has hills and valleys, and you can zoom into and completely rotate the 3-D model of your city. You have to dig in the dirt to lay pipes and construct subways. Your constituent Sims demand education and health care, and their IQs drop if you don't build them enough libraries and museums. If they don't like where you laid the train tracks, the Sims will drive cars; if they don't like your judgment (or lack of it), they'll vote you out of office or move to a neighboring city. You'll have to work hard to win their love.

Oh, and that annoying thing called the real world? That bag of meat you live in? That head that keeps peeking into your office, asking when you're coming to bed? All behind you now. Give in. The year is 2000 and you are the mayor of a brand new city. – Lisa Seaman

SimCity 2000, US\$69.95. Maxis: (800) 336 2947, +1 (510) 254 9700.



# **TIFFany**

Typical operations in image retouching programs like Adobe Photoshop can take minutes to complete. TIFFany II from BenchMark Development is the first of these programs to break the graphic artists' logjam by allowing an arbitrary number of operations to take place in the background while the artist continues to work.

TIFFany II sports a full complement of industry standard image retouching features and a strong interface at an eye-poppingly low price of US\$145 for noncommericial users (otherwise it goes for \$395). It runs on 486 or NeXT computers under the NeXTSTEP operating system.



## Eliminate image logjam.

But TIFFany does not implement the hot new retouching technology, FITS (Functional Interpolating Transformational System), which uses equations rather than bitmaps to represent images. FITS technology is what makes HSC Software's Live Picture the current state of the art (though it lacksTIFFany's multitasking capability).

These drawbacks aside, TIFFany under NeXTSTEP is a strong and inexpensive contender for graphic artists who need to work with images all day long. – Dan Lavin

BenchMark Development: +1 (606) 231 6599, info@bmd.com.

# The Miracle of Good Multimedia

This CD-I adaptation of the famous book *A Child is Born*, a collection of *in utero* photographs by Lennart Nilsson and Professor Lars Hamberger, could serve as a model of content-rich multimedia design. It never forces you to endure the "magic" of interactivity. You might leave the controller alone, once you've turned this title on, and watch an inspiring overview of the process of human reproduction from conception straight through to breast-feeding.

Which doesn't mean A Child is Born discourages interactivity. As the ten-month story unfolds (human gestation actually takes closer to ten than nine months), large, soft-edged photo-icons appear at appropriate moments, then disappear if you don't select them. Each leads to one of 75 digression sequences covering key topics in greater detail, such as smoking and drinking during pregnancy, morning sickness, and the role of the father. When a selected digression concludes, the main stream flows smoothly on again from where you departed. Interactivity remains an option, never an interruption or a chore.



Dive right into the amniotic fluid and watch the little fetus grow.

Control-panel selectors allow you to skip about from section to section, and even to specify your own "presenter" sequence of topics, a technique that should prove useful in targeting specific audiences or in teaching situations, where time is of the essence. Though focused on the mysteries of reproduction, as beautifully captured in Nilsson's photographs, the title is richly stocked with practical advice as well. The animations and illustrations are direct and clear without straying into the off-puttingly clinical. The title should serve equally well as a teaching tool for sexually active teenagers, a guide for expecting couples, and an aesthetic experience for the rest of us.

The British developers, Electronic Sounds and Pictures, Ltd., have chosen three narrators to offer several perspectives (British and American, male and female, doctor and mother). The writing is excellent. I would have liked to have had a behind-the-scenes explanation of how these amazing photographs were achieved, and to have been able to pause on more of them with nothing else on the screen. All in all, however, this is an exemplary effort. – *Jim Gasperini* 

A Child is Born: US\$49.95. Philips CD-I: (800) 845 7301, +1 (310) 217 1300.

# **Big Blues**

Paul Carroll's saga of the rise but mostly fall of the world's largest computer maker. However, this isn't actually about IBM; it's about IBM's microcomputer business, which is actually doing pretty well for itself lately. In fact the mainframe and minicomputer business contributed much more to the downfall of Big Blue.

Carroll states in his acknowledgements, "As you might guess, IBM didn't cooperate with this book." As you also might guess – after reading the book – Microsoft certainly did. Indeed, when you start reading, you could even get the idea it's about Microsoft. Bill Gates is mentioned in the first paragraph, quoted in the second, and dominates the next several. The book has lots of new and interesting details about the IBM/Microsoft relationship, but they're details that only Microsoft could have revealed.



Full of details only Microsoft could have revealed.

Big Blues is full of juicy inside stories – told with gratuitous pulp-novel drama – but it fails to translate its insider's perspective into any real insights into the company and the people who drove it down. Carroll is an excellent reporter, but in a book, you want to understand where the author is coming from. Because Carroll doesn't provide his own interpretation, you wind up with the IBM story according to Microsoft.

The last chapter takes a particularly nasty turn, with IBM employees literally slashing their wrists because of this evil empire, which Carroll overdramatizes by saying things like "IBM has probably hurt more people than the problems of any company in history." All in all, the book has some great historical information that makes it worthwhile for industry buffs, but it ends up reading more like a book-length Journal article than a real book. – Fred Davis

Big Blues: The Unmaking of IBM, by Paul Carroll, US\$24.00. Crown Publishers: +1 (212) 254 1600.

# **Photon Torpedoes**

An animated cartoon shown before a movie is one of the few things in this world that can make a crowd of adults stomp their feet with joy and scream like monkeys thrown into the back of a banana truck. Cartoons don't require any effort to enjoy; those superbright colors get blasted directly to the pleasure center of the brain without a lot of painful and unnecessary cogitation.

After a grueling day at Wired spent poring over comic books, playing computer games, and watching music videos for review in Street Cred, I like to unwind with an ice-cold Yoo-Hoo and a stack of cartoon videotapes ordered from The Whole Toon Catalog.

Subtitled "Access to Toons," the 100-page WTC sells just about every conceivable cartoon you'd ever care to watch. Want to see Fred and Barney sneak behind chez Flintstone



#### The toonster's bible.

and suck in big lungfuls of Winston cigarette smoke? You can, if you buy Animated Commercials #1 (US\$24,95) Just one episode of the first TV cartoon made in color, Colonel Bleep (\$14.95) will have you wondering if your Yoo-Hoo was spiked with DMT. Or choose from 21 different Speed Racer videos (\$19.95 each). My favorite episodes feature Speed's sidekicks Chim Chim and Spridle - each dumber than a bag of hair - screwing things up royally for the perky Racer

WTC also stocks lots of festival anthologies, Japanimation, and computer videos. Most listings come with a short synopsis, and there's a handy index in the back. If you hanker for the perpetual Saturday morning, the Whole Toon Catalog is your ticket to a fruitful life spent in front of a cathode-ray tube.

– Mark Frauenfelder

The Whole Toon Catalog: +1 (206) 391 8747, fax +1 (206) 391 9064.

# Triumph of Her Will

Were there an award for Best Idiot Savant Filmmaker, Leni Riefenstahl would win hands down. Filmmaker for Hitler's Third Reich, she claims Adolf forced her to make the award-winning *Triumph of the Will* chronicling the Nazis' Sixth Party Congress at Nuremberg. Never mind that she initially requested a meeting with Hitler after hearing him give a speech in which "It seemed as if the earth's surface were spreading out...."

Riefenstahl is now 91 and has just published her autobiography, *Leni Riefenstahl, A Memoir.* Now is the time for Riefenstahl to set the script straight: She never was a Nazi, although she did find a particular SS leader terribly attractive during one of the party rallies; she didn't know what was going on with the Jews (extermination) until after the war; and she never slept with der Fuehrer, not that he didn't make an attempt. (Herr Goebbels made several, she claims.)

When Riefenstahl sticks to descriptions of her filmmaking, the book is good (although the writing is terribly clichéd and replete with typos and untranslatable words – "medicaments" drove me nuts). A big surprise to me was the discovery that Riefenstahl, as early as the 1920s, was taking full advantage of multimedia – she was one of the first filmmakers to merge speech, music, images, and motion. She hired famous



Leni Riefenstahl: A brilliant artist with her head planted in the sand.

composers to write scores for her films, then synched the music with the film shot by shot. She also invented ingenious staging techniques – like tying helium balloons to dozens of cameras during the Berlin Olympics to get overhead shots of the games. Attached to the cameras were notes directing the finder to return the camera for a cash award – she didn't lose a single camera.

Whether one attributes them to naiveté or deception, her accounts of political ignorance – "I had no inkling of the human tragedies taking place..." – definitely seem defensive and contrived. Although she admits her ignorance was inexcusable, she offers quite a few excuses, not the least of which are her work, her boyfriends (who all come across as the macho type), and her health problems (a permanently damaged bladder, depression, and injuries sustained climbing mountains, stalking ice fields, and roaming deserts). In only one chapter does the war seem to intrude on her life – when the Allies bombed her home in Berlin, and she was in it!

What amazed me most as I read this book – compulsively, from cover to cover – was how such a brilliant artist could lead such a self-delusionary life. Ironically, although she intended to write this book in order to clear up her political reputation, for those who already condemn her, this work will only confirm their point of view. – Sylvia Paull

Leni Riefenstahl, A Memoir, US\$35. St. Martin's Press: +1 (212) 674 5151.

# L-Zone

t's just you and your mouse lost in the bowels of a futuristic technopolis. Imagine Rube Goldberg on acid wandering in the basement of Biosphere Ten, and you're ready for *L-Zone*, the latest CD-ROM title from Synergy, the folks who brought us *Alice* (see *Wired* 1.3).

With lots of electric dynamos, and lots of 60-cycle hum FX, this "Interactive Theater" on CD-ROM must hold the Guinness World Record for Most Buttons, Dials, Levers, and Switches in a Virtual World. As with Alice, there's nothing to learn, no instructions to follow; the idea is to navigate yourself through this technosphere, clicking every control panel, button, or sliding door in sight.

Beautifully designed and executed, L-Zone mixes a mind-boggling array of gadgetry with flashes of psychedelia, as when a random screen-click initiates a



L-Zone: A mind-boggling array of gadgetry.

five-minute, hypnotic QuickTime collage of mandalas, spirals, and moiré patterns.

It's likely you'll lose your sense of direction and/or your patience in *L-Zone*. Some of the devices are either dead ends or maddeningly impossible to figure out. As you click your cursor through an array of underground corridors, elevators, warehouses, and laboratories, there's a niggling sense that you've somehow failed to push the right button somewhere along the line.

L-Zone lacks the whimsy and humor of Alice, but you still get to do a lot of neat stuff, like re-animate a robot, blowtorch your way through a steel-clad door, and whisk around the tunnels of a space-age subway. Before you know it, you've been sucked into the L-Zone for a couple of hours. – Jim Metzner

L-Zone: US\$99. Produced by Synergy, Inc. and distributed in the US by East-West Communications: (800) 833 8339, +1 (310) 858 8797.



# Static Sucks

fter trying cordless phones from Sony, Panasonic, AT&T, and Southwind, I had just about given up. None of them could compete with the interference put out by my desktop computer, laser printer, and other office equipment. Conversations broke up because of static.

Then I tried the Tropez 900DL. This digital telephone, which uses 900-MHz radio waves forceful enough to penetrate buildings, was designed for today's office. Like the music from a compact disc, the 900DL's signal is digitally protected from interference. Ergonomically designed, well balanced, and filled with features (auto dialer, redial, mute, hold, flash, and volume control), this phone



#### Scanner-proof (for now).

even turns itself on if you pick it up while it's ringing — making it ideal as a desk phone as well as a mobile unit.

Worried about people tapping in on your conversations? Don't. Until digital scanners become widely available, there is little chance that anything you say over the 900DL will be overheard by anybody who isn't working for the National Security Agency. (Even the FBI does not have digital scanners – yet.)

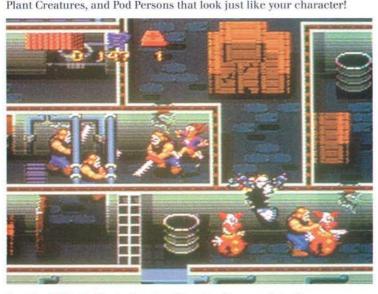
Tropez claims a 1,000-foot range; my range was more like 300 feet in the city – far better than the other phones I tried, which couldn't even transmit from my basement to the third floor. – Simson L. Garfinkel

Tropez 900DL Digital Cordless Telephone: US\$239. VTECH Communications: (800) 624 5688, +1 (503) 643 8981.

# **Movie Monster Mash**

You saw the movie, now play the game. Jurassic Park. Aladdin. Cliffhanger. Home Alone, even. Impressive titles, most of them, but of all the Hollywood-Meets-Silicon video game spinouts to hit the shelves, none is as literally eye-popping as Konami's Zombies Ate My Neighbors for Nintendo and Sega machines.

Featuring every B horror flick tormentor and cliché to ever hit the screen, Zombies serves up 55 bleedin' levels of maniacal, thumb-busting monster bashing. The object of the game is to save the neighborhood from death and destruction. Each level starts with ten neighbors to save, but that number dwindles with each neighbor lost to the freaks. The neighbors are a silly lot: There are annoyingly cheery cheerleaders, a fat man lounging in his pool, a pair of unsuspecting camera-wielding tourists, even a guy roasting weenies on the barbecue. All of whom seem oblivious to the monsters moving in for the kill: Undead Zombies, Massacring Chainsaw Maniacs, Mummies, Evil Dolls, Lizard Men, Blobs, Vampires, Giant Ants, Werewolves, Crazy Axe Kids,



Zombies: 55 bleedin' levels of maniacal, thumb-busting monster bashing.

Wiping out the monsters after the first few levels requires superquick reflexes and quick weapon changes. You start out with a water gun and build your arsenal with new weapons you find along the way, including exploding soda six-packs, rotten tomatoes, and decoy inflatable clowns. Graphics in the Sega Genesis version are pretty good, and really good in the Super Nintendo version (but not excellent). Sound is tops in both: Neighbors let rip blood curdling screams when attacked, chainsaws buzz menacingly, and zombies on your tail stroll around mumbling incoherent mumbo jumbo.

Control of movement is good and tight, but cycling through weapons takes a little getting used to – and a lot of skill to master. (Genesis players should definitely ditch their three button controllers for Sega's new six-button model, which *Zombies* makes good use of.) *Zombies* is definitely tough to beat, but, thankfully, passwords are given at every fourth level, which makes for less frustrating advancement. (I deplore games without passwords.) Two-player mode pairs you with a buddy for double trouble-shooting action.

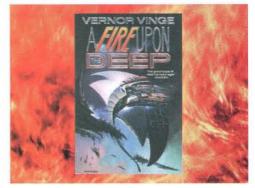
Like the countless B films that inspired it, Zombies Ate My Neighbors is, despite its grim premise, a killer of a good time. Yark! – Joe Hutsko

Zombies Ate My Neighbors, Super Nintendo: US\$65. Genesis: US\$55. Konami: +1 (708) 215 5100.

# A Fire Upon the Deep

ot since William Gibson gave us the fully realized world of cyberspace in Neuromancer has anyone given us so rich a diet of new ideas: Imagine a universe where the laws of physics vary along the axis of the great wheel of the Milky Way galaxy. As we move further out the axis the speed limit increases until the speed of light is no barrier. Further out that axis, beings of higher and higher mental capability inhabit the galaxy, their thought processes not inhibited by living in the "slow-zone." Unfortunately, we inhabit the slow-zone and so can't even imagine a world of faster-than-light travel and higher-order intelligences.

Perhaps the most inventive concept in Vernor Vinge's science fiction novel A Fire Upon the Deep is the group mind created by the integration of the



individual consciousnesses of a species resembling a cross between wolves and ferrets on a distant world (also in the "slow-zone"). Vinge explores what it is like to have a mind that endures and evolves even as the components in it mature and die. What is the meaning of a plural "self"?

Among the fun elements of the book is the literary device of creating a galactic computer teleconference, which itself becomes an actor in the story. A wideranging debate on the fate of the galaxy unfolds following the unprecedented event of the murder of one of the higher beings. Ultimately the issue becomes whether humanity should be eliminated for being responsible for the murder. The story has wit and style, but it's the ideas that maintain a grip on the reader. – Peter Schwartz

A Fire Upon the Deep, by Vernor Vinge, US\$21.95. TOR Books: +1 (212) 388 0100.

# techno tools for

# activities

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MB Floptical Drive (also reads/writes 3.5" 1.44 MB floppies)
C Multispin 3xi CD-ROM Drive, 295ms access

16-bit Sound Board w/ Wave Table Synthesis Black Minitower, 14" Color Monitor (Non-Interlaced 1024x768) Black Keyboard, Labtec Spekers, and mouse Installation and Testing, Dos 6.0 & Windows 3.1 included One Year Warranty

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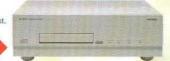
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Jaminator Guitar Synthesizer (\$189) Additional Music ROMs (\$19 ea.) Sync-cable (\$16)



# PERSONAL VIDEO COMMUNICATIONS

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modem, Phonebook with saved images, Video mall w/voice, Incoming call announced or auto answered, Voice data switching on single line. BBS support and software updates. Requires 386 or higher, video board, modem, and Windows. Works with standard camcorder or desktop motion video camera. VidCall Kit includes software for two stations and user instructions. (\$149)

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# Chaos Control Digizine

n a fine display of Digital Darwinism, Chaos Control, a new 'zine-on-a-floppy, is evolving something many of its ancestors lack: decent writing. It's practically a real magazine, even though you can't fold it up and carry it into the bathroom. If there ever was a perfect pop application for a HyperCard stack, this 'zine about techno-industrial dance music is it, especially given that many industrial enthusiasts actually enjoy trancing out in front of a VDT.

Chaos Control is an electronic extension of the 'zine movement, in which the do-it-yourself ethic responsible for spurring so many of the great innovations in popular music reaches over into criticism. In this way, people who really care about music are able to wrench taste-making chores away from glossier, advertising-driven rags. These folks don't get paid,



Good writing, despite the HyperCard format.

but free electronic publishing via the Internet is becoming increasingly common, nonetheless.

Chaos Control stands out among e-mags because about 80 percent of its articles are readable, thoughtful criticisms, written by people concerned about how each band they're critiquing affects them. Reading Chaos is a sort of parallel universe experience: The quality of writing, the overflowing well of articles (no ads yet!), even the look of that graphic or photo standing alongside the scrollable text, work to remind you of a stint with a paper 'zine. If you're into the subject matter, Chaos Control is worth reading, despite the electronic format. It's not revolutionary, but it's definitely a viable mutation. - Thomas Hays

Retrieve (text only) from world.std.com; cd /obi/Zines/Chaos.Control via anonymous ftp. HyperCard version: US\$5. Send to publisher Bob Gourley, 3 Greenville Drive, Barrington, RI 02806.

## **Boredoms**

Pop Tatari Reprise

Access Code: 1233

Japanese music is poised for invasion, and Osaka's Boredoms are the movement's supergroup. Led by Yamatsuka Eye, these guerrillas perform titles like "Okinawa Rasta Beef Mockin' Fuzz2." Boredoms' mosh starts with six mixed-gender voices that scream, curse, squeal, argue, spit, and slurp noodles like a Tourette's convention captured on disc. Add '70s funk, whammy bar, dueling drummers, Mötorhead riffs, and a dose of improvisational theater, and the resultant maniacal audio disgorge makes Ren and Stimpy look lethargic. Head for the bunker and bring a blaster. - Colin Berry





# Material

Hallucination Engine Axiom

Access Code: 1237

Not since Mingus has there been a bass player who has composed as much music in a lifetime as Bill Laswell. A master of both the electric bass and the recording studio as instrument, Laswell has built a small yet prolific empire at Axiom, Hallucination Engine is definitely the best Material album to date. Every continent is represented, and groove reigns supreme. House, jazz, funk, rock, dub, ambient, African, Indian, Middle Eastern, Chinese (!) all swing like mad. This is the real shit - Will Kreth

# **Rise Robots Rise**

Spawn

**TVT Records** 

Access Code: 1234

Give Robots credit for freshly reinterpreting funk: high-tech grooves peppered with world beat, reggae, hip hop, and jazz, all with a hard backbeat and plenty of wah-wah pedal. Their lyrics smooth-rhyming, buttery blends of PCness - and some dazzling fifth-tone vocal harmonies rescue songwriters Joe Mendelson and Ben Nitze from blatant Parliament/ Funkadelic plagiarism. You can trust me - an uptight white cat from the 'burbs - when I say if you want squeaky-clean beats with shine and polish, give Spawn a spin. (If you want da real funk, cue up George Clinton's latest.) - Colin Berry



# Leon Fleisher, Piano

Piano Works for the Left Hand

Sony Classical Access Code: Unavailable

Pianist Leon Fleisher, who suffers from carpal-tunnel syndrome, presents a recital of compositions for the left hand alone. including works by Brahms. Saint-Saens, and Scriabin. These performances can be admired for Fleisher's technical prowess: a symphonic metamorphosis of Strauss waltzes by Leopold Godowsky, for example, is a dazzling, virtuoso showpiece which Fleisher pulls off with good taste to boot. This unusual repertoire is much more than mere curiosity and is well worth hearing. – Bryan Higgins

# Joe Henderson

The Blue Note Years **Blue Note** 

Access Code: 1235

Joe Henderson's genius on tenor sax is his facility with a multitude of styles. Whether leader or sideman, he blows bop, blues, or Latin with consistently fluid grace and melodiousness. The vast array of personnel on this compilation (Kenny Dorham, McCoy Tyner, Ron Carter, to name a few) further evokes Henderson's mastery of the music, and his tonal and textural virtuosity with such classics as "In 'N Out," and "Y Ya La Quiero." Spanning 1963 to 1967, this compilation is a great introduction to both Henderson and post-Parker jazz. - Peter Herb ...

# **Cocteau Twins**

Four Calendar Café Capitol Records

Access Code: 1236

Time and again, the soaring sound of heavenly vocals and interwoven instrumentation has elevated this British trio to dazzling plateaus of expression. Cocteau Twins continue this upward spiral with Four Calendar Café, their first release after leaving the 4AD label. The Twins offer rhythmic emotion with the refinement of experience. For over a decade, Cocteau Twins have refused to compromise their unique, aural magic that soothes the mind, body, and soul. Instead, they prove it a timeless art. - Nori Castillo





# **Sun City Girls**

Torch of the Mystics **Tupelo Recording** Company

Access Code: 1238

The Girls' first CD in their twelveyear career is a testament to both their Eastern travels and their scruffy underground roots. sifting a seething mess of Moroccan-jazz-chant rhythms into concise tunes. Bassist/vocalist Alan forsakes words, invoking half-syllables and cries instead to tell ancient folktales betwixt brother Rick's tangled network of electric guitar and pal Charlie's relentless drumming. The Girls toy with organ, bells, and strange horns, but magic happens when they sculpt otherworldly beauty with just rocktrio instruments and voice. - Patrick Barber



Cocteau Twins

# **Daniel Denis**

Les Eaux Troubles Cuneiform

Access Code: 1239

Formerly of Univers Zero - an obscure but magnificent experimental rock ensemble - Denis has always produced music that is difficult to peg: Zero's music might be described as a fusion of Magma, King Crimson, and Bartók. Once again, composer, drummer, and keyboardist Denis explores territory with music at once trenchant and brutal; horrific vet irresistible. The rhythms are irregular and jagged, the harmonies piquantly dissonant, and the melodies angular, if not downright bizarre, yet the music is utterly compelling. If you're up to the challenge, Troubles is not to be missed. - Dean Suzuki ...



# Wired's Music Access Hotline

t the top of the music reviews on the facing page you'll find a four-digit code for each album. Call the 900 number (listed below), and punch in the album's code when prompted. You'll hear one to three cuts from the album, lasting up to three minutes (it costs 95 cents per minute for the call). You can quickly "fast forward" through an album by punching the number 3, and sample a number of albums in just a few minutes (louder volume is 4, softer is 5). To use Music Access, you have to be 18 and have a touch-tone phone.

# MUSIC ACCESS

If you'd like to hear excerpts from these discs,

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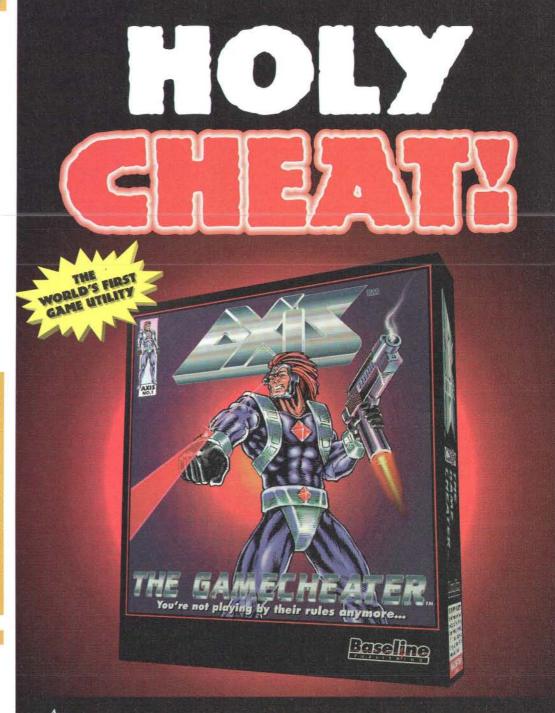
Music Controls: 3-Fast Forward

4-Louder 5-Softer

\*-Exit music/bypass most prompts

A charge of 95 cents per minute will appear on your phone bill. An average call is about 2.5 minutes. Music Access samples for reviews in this issue are active February 16,1994 – March 16,1994.

Code	Artist and Title
1233	Boredoms Pop Tatari
1234	Rise Robots Rise Spawn
1235	Joe Henderson The Blue Note Years
1236	Cocteau Twins Four Calendar Café
1237	Material Hallucination Engine
1238	Sun City Girls Torch of the Mystics
1239	Daniel Denis Les Eaux Troubles



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# 1. Video conferencing

Video conferencing bears a terrifying promise: Distance will no longer be an excuse for not attending meetings. Desktop video conferencing transforms a typical dry meeting into an excruciating experience of droning, tinny voices and grainy shadows that flicker in and out of view. Only a masochist, or, as in 1984, someone of very low rank, wouldn't immediately click the window off. If you don't believe me, try sitting through one of the Internet Engineering meetings now being broadcast over the Net. Yet, industry analysts expect us to be terribly excited by the idea of desktop video conferencing. Just what kind of meetings do analysts go to anyhow?

#### 2. Standards

After watching the ATM standard become accepted before it had even been tested, and then seeing the HDTV standard battle resolved by fiat, I theorized that the industry had learned that settling on a standard was more important than the quality of the standard. I was wrong. While the industry does now agree on standards before they are de facto, companies have a tendency to agree on multiple standards, or standards so broad as to be meaningless, thereby nullifying the intent of standardization. For example: The Ethernet standards committee was unable to come to consensus and so a schism occurred, producing two different official Ethernet committees. The consumer gains nothing, but now every company can claim to adhere to "the standard."

	Current Position	Position Last Month	Months on List
Video conferencing	1	-	1
Standards	2	-	1
John Sculley	3	-	1
Green PCs	4	1	2
Video on demand	5	2	3



## 3. John Sculley

Just last year John Sculley was known as a marketing genius and a true economic hero; now he is routinely characterized as a bumbling fool who ruined Apple. In some ways this is Sculley's fault, not because he made any terrible errors, but because he was so successful with his hype that people began to believe Sculley really was a technological Prometheus. Sculley now says he is tired of "multimedia hype" – hype which he is largely responsible for – and it looks like he is tired of the hype surrounding his career as well. He has taken the first step in hype recovery: "My name is John, and I'm a capitalist. Not a revolutionary."

#### 4. Green PCs

The EPA's Energy Star program couldn't be better for computer manufacturers: It's a nice selling point that requires a minimal investment. For one thing, no testing is done to ensure that products which are billed as Energy Star compliant truly are. This is partly because the EPA doesn't have the money, and partly because the Energy Star specifications are so vague that with a little creativity almost any computer could be considered compliant. But this is not to say that most vendors will cheat. Computer technology is going low power anyway due to technological limits on speed and heat dissipation. So, more than anything, Energy Star is just a way to brag about what you already have and an excuse for an extra sticker.

# 5. Video on demand

Although computer companies are relentlessly hyping video on demand, cable companies have been more muted in their enthusiasm, and for good reason. Video on demand requires a huge investment in equipment and is in many ways a zero-sum game for the cable companies: Much of the money earned from video on demand is money which previously would have been earned from HBO or other premium movie channels. And of course there's the content problem: How do you get the rights to movies people want to watch? The easy solution, buying a film company, would result in a few good movies and endless schlock-on-demand. This may be one new technology where the the hardware companies come out ahead.

# - Steve G. Steinberg

# Note-Worthy Software

ou can plug your MIDI keyboard, horn, or guitar into a number of walletemptying programs and - as long as what you play isn't too complicated and if you stick strictly to the tempo given by a click track - they will try to write down what you play. Playing musically - slowing down and speeding up and swinging your rhythms - yields a mess. This has nothing to do with the programs and everything to do with the fact that music notation and performance are distant cousins. If you play music the way it's notated, it sounds dead. If you notate what you really play, it's

Encore 3.0 provides a better way: inputting your masterpiece a note at a time rather



# The right way to notate.

than in real-time. You can play in real-time and it will fudge notation as best it can; but it is much less frustrating to enter notes one at a time on the MIDI keyboard with one hand and type durations with the other. That way you write what you mean, not what you happen to play.

Encore will play notated music on synthesizers, record and playback accurately in real-time, and produce very good looking music notation. Lyrics, guitar tablature, automatic chord parsing, and a lot of other stuff is in there.

Encore is probably the easiest to use of the professionally capable music programs, and that's what plays my tune.

— Jef Raskin

Encore, US\$595. Passport Designs Inc: +1 (415) 726 0280.

# My Favorite Information Appliance

of all the digital gizmos I carry (Newton, Duo, pager, wireless modem, plus occasionals like a cellular phone and Zoomer), my favorite is the Sony Scoopman. Officially known as the NT1 Digital Micro Recorder, Scoopman is a lightweight (less than 6 ounces), Lilliputian (4.5-x-2-x-1.5-inch) recorder that uses postage-stamp-size 90-minute digital tape cassettes and runs for six hours on a single AA battery. Scoopman is so small that it almost disappears in my briefcase, and the tiny tapes are easily lost in a shirt pocket.



Scoopman: The number one sanity/productivity tool.

I bought Scoopman to tape interviews – its sensitivity and sound quality leaves cassette recorders in the dust; it is unmatched by anything except my minidisc player. But the big surprise was that Scoopman is a killer stereo music player! It is invaluable as an antidote to jet-stress on long flights – no more vapid airline music!

I rate Scoopman as my number one sanity/productivity tool. Only one bummer – price. Scoopman costs upwards of US\$900, and the cassettes go for \$18, but anyone who travels a lot will find it worth every penny. – Paul Saffo

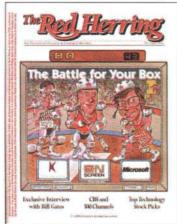
Sony: (800) 222 7669, +1 (201) 368 9272.

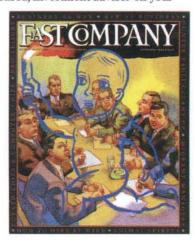
# Magazines for the Business Digerati

Business magazines have hit a wall. Like many of the companies they cover, *Forbes, Fortune*, and the rest have gotten too big and too fat; they are in need of massive restructuring.

That's why I got so excited when I first saw *The Red Herring*, a smart, five-issue-old technology finance magazine, and *Fast Company*, a "New Economy" magazine that premiered in November with a slick prototype (its high-tone ads were not paid for). Both magazines are in the throes of start-up: When I called *The Red Herring* requesting the November issue, they rather sheepishly informed me it was three weeks late. And over at *Fast Company*, no commitments were made to a publishing schedule: Once feedback is gathered on its "beta" issue, *Fast Company* – backed by an impressive list of businessfolk – will go bimonthly sometime in mid-1994.

In the late '80s, Anthony Perkins's *Upside* gave the strange and silly world of Silicon Valley venture capital a unique and authoritative voice. Last year, Perkins left his brainchild (don't ask, it's a long story) to create *The Red Herring*, which takes its moniker from the preliminary investment prospectuses of the same name. With a clever, informed, and thorough editorial style, *The Red Herring* left me wishing I had money to invest in high-tech stock. In fact, reading *The Red Herring* is like having a smart, if narrowly focused, investment adviser on your





# Two business magazines: a sharp investment guide and a politically correct yawn.

desk every month (or so...). The Red Herring ain't slick, and the covers still suffer from Upsidis (silly cartoon caricatures of business figures), but it's worth the money.

Fast Company was founded by ex-Harvard Business Review editors. Its promise: "To be the first word in cutting-edge business thinking." Its aims are to "identify the values of the (business) revolution" and its commitment is "to merge economic growth with social justice, democratic participation with tough-minded execution."

In short, *Fast Company* aims to be the PC business magazine of the '90s, and by PC I don't mean personal computer.

With such lofty goals, you gotta deliver quite a compelling read. Instead, *Fast Company* is an amalgam of clichés (Business Is War, Managing Change, Create Healthy Tension) and, well, straightforward stories about successful, honest, hard-working, green, smart, young people. Yawn.

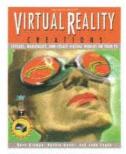
Memo to the editors of *Fast Company:* You've got a good concept, but don't overdo it. Get a sense of humor, for one thing – the best article was a spoof of modern-day leisure practices. And stop forcing your writers into using tired, Tom Peters clichés like "leveraging knowledge." If you tell a compelling story, readers draw their own conclusions. That's a good way to change the world. – *John Battelle* 

The Red Herring: US\$90 for 12 issues, +1 (415) 780 9070 , fax 1+ (415) 780 0539. Fast Company: US\$29.95 for one-year charter subscription. (800) 505 3278, fax +1 (617) 497 1363.

# Experience VR for Virtually Nothing

wirtual Reality Creations starts with a succinct primer on computer generated worlds, touching on theory and current limitations of the technology. But the meat of the book is about creating and using VR, especially with REND386, a 3-D VR-development toolkit for DOS that comes bundled with VRC on floppy disk.

Using the fold-up 3-D viewer included with the book, anybody with a 386 PC can explore VR. If you get into it, you can grab C source code to use with it from public ftp sites. Or join RFND386-related online confer-



ences. Or wire a PowerGlove and stop using your keyboard and mouse. Or...

My favorite REND386 world is RIDES.WLD, a magical land of virtual balloon rides, Ferris wheels, and merry-go-rounds. You navigate into a Ferris wheel seat to be greeted with "Welcome Aboard!" before you get carried into the air, a fine example of the out-of-body-experience potential of VR-based computing. – Paco Xander Nathan

Virtual Reality Creations, by Dave Stampe, Bernie Roehl, and John Eagan. US\$34.95. Waite Group Press: (800) 368 9369, +1 (415) 924 2575.



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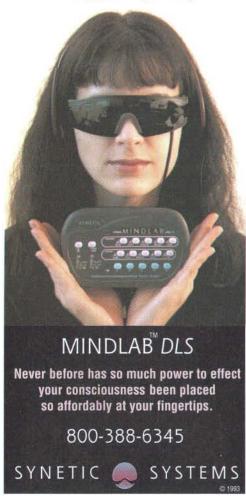
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# Snug in the Ear Canals

don't usually bliss out on the bus to work, even when I'm packing music. Even if I could afford earphones that made my portable CD player sound as good as my home system, road noise would grind its way right through the music. But when I plugged a pair of Etymotic Research ER-4s into my ears, everything changed. The phones fit so snugly into my ear canals that any noise receded deep into the background, before I turned my music on, When I did, the sound was crystal clear and natural. And though their US\$330 price is hardly cheap (even for ruggedly built little phones with plenty of useful accessories), it's only about a third of what standard



# Gives good bass.

headphones this good cost.

In part that's because the sound the ER-4s pipe directly into your ears is a remarkably good match for the sound that normally floats into them through the air. (The ER-4s' frequency response is deliberately not "flat," but is contoured to match the frequency deviations that ears normally add to sound reaching them from outside.)

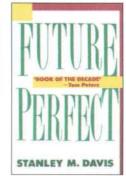
The price and quality suggest professional use. But the ER-4s are efficient enough to get good, loud sound from most pocket tape or CD players — and effective noise sealing means you don't need to play them really loud to hear the music. — Ivan Berger

Etymotic headphones, US\$330, Etymotic Research, +1 (708) 228 0006.

# **Future Perfect**

stand Davis's Future Perfect stands out as a visionary – indeed, downright strange – manifesto of permanent economic revolution. Davis sums up his vision in four phrases:

- Any time: Products and services should become available the instant a customer develops a need.
- Any place: Products and services should travel to customers, not vice versa.
- No matter: Manufacturers should separate the information contained in a product from the physical matter that gives it form.
- Mass customization:
   Production processes should generate an infinite variety of



goods and services, uniquely tailored to customers.

These precepts, of course, only make sense in a networked world, and Davis describes numerous network-heavy companies that are headed that way. The result is a kind of capitalist millennium, with all of the positive and negative consequences that this might bring: infinite convenience and infinite opportunity for addiction; perfect competition among manufacturers and perfect competition among employees; instantaneous adaptation to shifting desires and instantaneous changes in jobs, incomes, and the wellbeing of families. Heads up. - Phil Agre

Future Perfect, by Stanley M. Davis. US\$11.95. Addison-Wesley: (800) 358 4566, +1 (212) 463 8440.

Street Cred Contributors

**Phil Agre** (pagre@ucsd.edu) teaches at the University of California, San Diego, and is at work on a book tentatively entitled *Computation and Human Experience*.

Patrick Barber recently composed/performed/recorded a suite for bowed bicycle, ridden bicycle, and incidental accompaniment. He is also a writer.

**Ivan Berger** has been writing about audio and other aspects of electronics since 1962. He's currently technical editor of *Audio Magazine*.

**Colin Berry** has written reviews and articles for the *SF Weekly* and *bOING bOING* magazine. His fiction has appeared in *Transfer 65*.

Frederic E. Davis (3057504@mci-mail.com) is author of *The Windows Bible*. He is a columnist and contributing editor for *Windows-Sources*.

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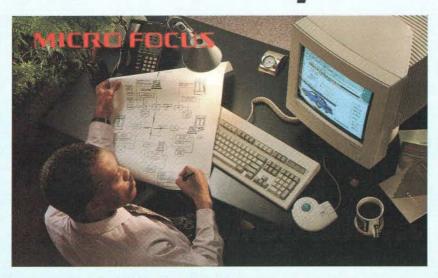
**Dean Suzuki,** PhD, is a professor of music history at San Francisco State University.

# If you want to stay ahead of your competition... don't miss Computer Watch!

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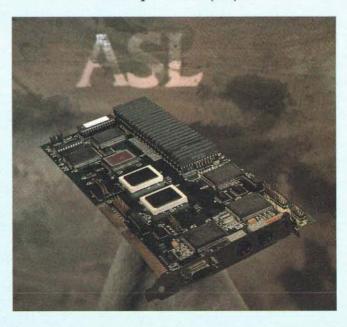


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# February 24-27

### TED5;

# Monterey, California

The fifth of the TED series - a convergence of technology, entertainment, and design - will focus on learning and communication. Speakers include Bill Atkinson, chair of General Magic; Jay Chiat of Chiat Day; Nicholas Negroponte; Trip Hawkins of 3DO; Herbie Hancock; and Oliver Stone, to name a few. (John Sculley and Chairman Bill will also be there.) As in past years, Richard Saul Wurman emcees. Expect to see only the biggest and brightest at this gettogether, as admission is US\$1,450 a pop. Continuing the "thinking conference" agenda, TED will focus on cutting-edge projects that will guide our future. Call: +1 (401) 848 2299, fax +1 (401) 848 2599, e-mail wurman1@applelink.apple.com.

# March 16-19

# Technology and Persons with Disabilities; Los Angeles, California

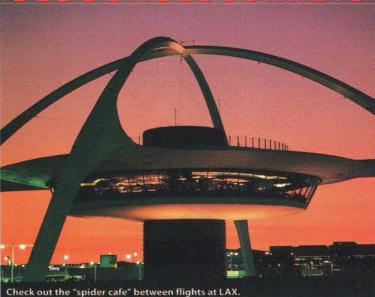
More than 300 speakers and upwards of 100 exhibitors will converge on the Los Angeles Airport Hilton for this ninth annual event. This year, Lawrence Scadden, director of programs for persons with disabilities at the National Science Foundation, will deliver the keynote address on "The Electronic Highway." The conference will also spotlight virtual reality, as it has on past occasion. "Preconference day" fee: US\$150. General session fee: US\$235 (includes reception coinciding with the opening of the exhibit hall the eve of March 17). Contact Dr. Harry J. Murphy at the Center on Disabilities: +1 (818) 885 2578, fax +1 (818) 885 4929, e-mail hmurphy@vax.csun.edu.

## March 23-26

# Computers, Freedom & Privacy (CFP'94); Chicago, Illinois

CFP'94 boasts a roster of sponsors (such as the EFF and ACLU) that would impress any activist. In its fourth year, CFP'94 will continue to focus on personal privacy and corporate security in the context of our information society. This year, the scientists, scholars, and hackers will hole up to examine the benefits and burdens of communications tech-

# **DEDUCTIBLE JUNKETS**



# If You're Headed to Los Angeles for the Conferences

What hasn't already been said about this urban sprawl of pink bungalows, clotted freeways, and rented Porsches? The City of Angels is a myth unto itself – its aura emanating from hundreds of smoggy square miles and a myriad of walled cities, spewing the promise of stardom or being "discovered" in a crowd, unctuous under its veneer of tans and surgically altered bodies.

However, buried beneath the rolling hills of rhinestones is a trove of weirdness that thrives and breathes beyond the pale. The city is flecked with many good movie theaters, such as The Bruin on Le Conte Avenue. If you're stuck in line, amble across the street to Stan's Donuts. For a journey back in time, have a seat in The Silent Movie Theater on Fairfax in Hollywood - the only theater we know of that shows Keaton, Chaplin, and Laurel and Hardy with live piano accompaniment. For movies at home, bring your plastic to Mondo Video a Go-Go on North Vermont. Here, you can rent everything from drooling-late-night-TV-preacher programs to super-low-budget schlock horror films. Next, travel a few blocks to Dresden's, a local bar that was a jumpin' steak house about 25 years ago. Complementing the divey decor of plastic plants and faux boulders, you'll find an endless parade of lounge lizards - both on stage and off. Truly a Twin Peaks experience.

To cleanse yourself of the surreal ooze, travel back to Fairfax and squeeze into Olive. Not as hip as it was in recent years, this is still a comfortably cool place to drink, eat, and stargaze. Try the mondo pu pu platter for a taste of the wacky, and don't miss their killer martinis! Continuing into the dark and smoky, make a reservation at Dominick's on Beverly Boulevard. Sit among small tables of people who look like they're probably famous, enjoy steaks or glacial martinis, and don't forget to bring spare quarters for the juke box, which boasts an impressive selection of old jazz and blues 45s.

If all the public posing of the restaurant/bar scene gets tiresome, bring your eyeglasses and thirsty ears to Compact Disc-Count on West Pico. Thumb through rows and rows of discs, and read the spines of everything from recent releases to cheesy oldies. Great bargain bins, too! If you're more interested in the interactive, here in the city of rock stars, wander into McCabe's, a guitar shop with neat rows of metal folding chairs and a tiny stage, sometimes graced by such performers as John Doe, PJ Harvey, and Pere Ubu.

For an outdoor break and maybe even a beautiful sunset behind the smog, motor out to Zuma Beach or Malibu – before the mudslide season. But as you're admiring all those dudes and babes, remember these words of warning... body by Nautilus, brain by Mattel. – Kristin Spence

Hugs and air kisses to Mark Frauenfelder and Carla Sinclair; righteous thank-yous to Dave Yasuda (a.k.a. Jimmy the Java Crazed Chimp). You rule! nologies, looking pointedly at minimizing their scarier implications. US\$145-\$420. Contact George Trubeau: +1 (312) 987 1445.

# March 30-April 1

#### Sumeria;

# San Francisco, California

Sumeria, or more specifically "The International QuickTime & Multimedia Conference and International Film Festival," will bring together all multimedia technologies and products available for the desktop. Registration fee includes technology tutorials, how-to sessions, product sessions, and an international film festival – open to the public Friday, April 1. Over 100 multimedia products will be exhibited and sold on the floor. US\$249. Call: +1 (415) 904 0808, fax +1 (415) 904 0888, e-mail sumeria@applelink. apple.com.

# April 12-14 New Media Expo:

# New Media Expo; Los Angeles, California April will mark the maide

April will mark the maiden voyage of this event, sponsored by the same folks who bring you Comdex. The crowd will consist of business and technical executives, interactive information providers, distributors, and professional users. On the floor will be a kaleidoscope of hardware platforms, communications gear, consumer electronics, and infotainment software. US\$75-\$495. The Interface Group, Public Relations Department: +1 (617) 449 6600, fax +1 (617) 444 4806.

#### April 12-17

# Toward a Scientific Basis for Consciousness; Tucson, Arizona

Invited to this interdisciplinary event are representatives from fields such as psychology, computer science, physics, neuroscience, and philosophy. The conference is sponsored by the departments of psychology and anesthesiology at the University of Arizona, and will feature a host of speakers, covering issues of quantum coherence, dendritic microprocessing, pharmacology, and Jungian synchronicity and consciousness. Truly a highbrow affair for higher brows. Contact Jim Laukes: +1 (602) 624 8632, fax +1 (602) 621 3269, e-mail jlaukes@ccit.arizona.edu.

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editor Wired

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edited by Kristin Spence



# RTFM - Or At Least a FAQ

A good teacher will tell you that there's no such thing as a dumb question. But even the most angelic, tolerant educator gets tired of hearing the same question over and over and over and over....

However, there is a workaround.

The collective Net has solved this problem by organically evolving documents called FAQs, or Frequently Asked Questions. One way to retrieve these is to read the relevant Usenet newsgroups. For instance, FAQ lists corresponding

to such Internet services as telnet, gopher, and IRC can be found at alt.internet.services. Similarly, the four-part FAQ on tattooing is posted to rec.arts.bodyart. A scholarly compendium of good electronic resources for weather-heads is posted to sci.geo.meteorology. Also, for ease and greater accessibility, most FAQs are cross-posted to the general purpose group, news.answers.

If you don't want to wade through the somewhat murky

waters of Usenet but are on the Internet, you can also visit the FAQ repository (ftp to rtfm.mit.edu, login as anonymous, enter your e-mail address as the password, then cd [change directory] to /pub/usenet/news.answers). Alternately, you can utilize a gopher site that points to the repository: gopher to gopher.well.sf.ca.us, and select The Matrix, then Usenet.

Once there, you'll find over 300 entries for FAQs or multi-part FAQ subdirectories. Allow yourself enough time to look and learn. In addition to those mentioned above, you'll find a hilarious urban myth debunker (folklore-faq), guides for animal care (cats-faq, fleas-ticks), religions (from alt-buddha-short-fat-guy to shamanism), or anything from autos to

woodworking. Of course, there's a FAQ for every computer you've ever heard of (plus many you haven't).

Visiting the rtfm.mit.edu FAQ repository is like going to a quilt exhibition. Each FAQ is a unique response from a community to its own perceived needs. You learn as much about the people who have sewn the stitches as you do about the ostensible subject.

And if there's no FAQ for the subject you're interested in, start one. Scratch together an outline, post it to the relevant newsgroups, and see what kind of feedback you get. At best, you'll have the first draft of a useful document. At worst, someone will tell you to read an already existing FAQ. —
Eric Theise verve@well.sf.ca.us

# 4,000 MUDmen of the Apocalypse

If druidic isles and caves of fire strike your cyber-fancy, Apocalypse IV should prove a favored site. Apocalypse is a fantasy theme dikuMUD (type of Multi-User Dungeon), with emphasis on game play, rather than strict role play. Discuss everything from quantum physics to movie trivia while battling the forces of evil alongside an international group of players (regulars number about 4,000). Apocalypse has undergone four major code iterations, and now contains 53 fantasy zones - 26 of which have been written and created by the players themselves. Characters can be humans, halflings, elves, giants, paladins, bards, druids, or thieves, to name only a few options. Explore the Isle of Tuatha de Danaan, the Hive of Handrea, the Temple of Mars, or Aurvuron by telnetting peabrain.humgen. upenn.edu 4000; or mail apoc@peabrain.humgen. upenn.edu for more information on the Apocalypse.

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WIRED FEBRUARY 1994



# Samurai Surfing USA

Truly making waves, TWICS, Japan's very first public access Internet system, is now up and running! Based in Tokyo, and a pioneer on Japan's electronic frontier for nine years, TWICS is now accessible to individuals and companies all over Japan. TWICS (which stands for Two Way Information Communication System - a racy moniker nine years ago) offers standard Net capability, including email, conferencing, and Usenet via modems, packet networks, and now, a simple telnet command. The system is English-based and hosts members from Japan and many other countries. To join TWICS, dial + (03) 3351 8244 via modem, login as quest, and follow the prompts. Monthly subscription is US\$28; e-mail services are free. Or simply hang ten across the Pacific to 192.135.222.3. For more information, e-mail info@twics.co.jp.

#### Rockin' Your World

California resident surfers might want to investigate this informative site for the low-down on seismic activity (or at least a surf report on the next tsunami). In fact, surfers everywhere should have a look, as this server lists current facts and figures about temblors around the globe. Though it may not help you plan for The Big One, every recent earthquake is listed here, including its date and time, latitude and longitude, geographic area, depth (in kilometers), and magnitude. You'll also be able to ascertain the source credibility and accuracy level, thanks to an A-to-Z rating system. If you're shakin' for more, investigate geophys.washington.edu, via anonymous ftp, and cd to /pub/seis-net for an extensive list of tectonic disquiet. Rockin' good news!

#### This Ain't No Tie

Armchair generals: Mobilize your forces in the direction of *Bolo* – a multiplayer tank battle arcade/ strategy game. Bolo is unfortunately not available on all platforms, but nonetheless has created a rapidly expanding cult following on the Internet. This particular game appeals to a slightly different audience than *Netrek*, as part of Bolo's focus is the exploration of new territory (there are many "maps" available on which play-

# ers can do battle), as well as the construction of defensive structures, roads for mass transit, barricades to slow down enemy travel, and other such missions. For more info, check out Usenet newsgroup alt.netgames. bolo. You can also find Bolo via anonymous ftp at bolo. stanford.edu. (The site is frequently inaccessible, so be patient. Or try briefing your troops at sumexaim.stanford.edu cd/info-mac/game/bolo instead.)

# **Apples for Bookworms**

Eager for instant notification of the newest publications in computer science and engineering? Subscribe to the Computer Science Technical Reports SDI Service mailing list at Stanford University - part of DARPA's electronic library project. The service maintains an accurate profile of each user. Each new computer science publication is then scanned against the profile database. If the article matches your profile, you'll receive the reference. More important, you decide whether and how often you should be notified by the service daily, weekly, quarterly, and so on. The abstracts are written in English and utilize a relevance feedback system, allowing you to request of the server more articles "like this one" or less "like this one." Send mail to elib@eclipse.stanford.edu with the word help in the subject line for complete instructions. A second, similar service filters all netnews: For it, surf to netnews@eclipse.stanford.edu. Then wax up your slide rules.

#### Post Haste

Online post-a-holics who don't already know about Citadel should peek into this no-cost, forum-oriented BBS run by the Iowa Student Computing Association (ISCA) at the University of Iowa. This site is updated, continually nurtured, and gardened by a Policy Board of nine members. (At any given time, you'll find at least one sysop, programmer, and forum moderator present online.) There are over 178 forums covering such familiar topics as art, literature, politics, Eastern studies, photography, and of course, Deep Space Nine. Putting the traffic of any forum to shame, however, is the nonstop post frenzy of the Babble forum - an unmoderated chat room of hundreds of conversationalists. Citadel can handle up to 500 users at a time and boasts a rapidly growing user base of over 18,000 posters. Telnet to 128.255.40.203, login as new and follow the prompts. Citadel's lines are queued, so, if you're connecting at rush hour, just be patient.



# Roll 'Em!

Perhaps you're prepared for the perfect evening out with a friend but don't quite know if that classic film is really one you'll like. Or perhaps you're losing at *Trivial Pursuit* and have a wired laptop handy. Regardless, floating on the cyber-seas of the United Kingdom is an unnamed

database of approximately 6,500 films, offering complete cast lists, synopses, and even a list of film nominations and awards received. Peruse very detailed plot descriptions, character abstracts, information on actors and directors, deconstructions, and analyses. If this seems a bit daunting,

send a note to the server with help in the subject line. Once connected, the server will prompt you for a keyword. While the search capability isn't particularly sophisticated, partial boolean searches are possible. For instance, to search for films featuring Pee Wee Herman, enter herman; to

find films featuring Pee Wee and Chairry, enter herman and chairry, and so on. Burrow your gopher to info.mcc.ac.uk, then choose Miscellaneous Items, and Film Database to unearth this gem. And don't talk during the movie.

#### Newton's Other Good Idea...

For the latest news, software, or shareware for your Newton (or its Sharp counterpart, the Expert Pad), paddle over to bnnrc-srv.med.jhu.edu via anonymous ftp, then cd to /pub/newton to witness the site that claims to be the very first of its topic. Among the multitude of articles, you'll find many Newton digests from various Newton groups, such as the Newton-Lists of Dartmouth and MIT. All the latest updates and shareware/freeware programs are uploaded here first, so don't miss this wave. Also available are various FAQ lists and files on everything from software titles, user interface notes, gripe and bug lists, to sheets on fabricating Newton-ROM cards.

# Eye of the Beholder

Once again gracing the pages of Net Surf is a Crosswire Project visual collaboration (see facing page, left). Crosswire, brainchild of Ed Stastny of the OTIS Project, is the second in a continuing series of Net-based visual galleries, with more than 40 artists participating. Image d2c5a7 is the work of collaborators Alx Ladygo, Simon Gibbs, and Mike Tressler. This and other Crosswire images can be found via anonymous ftp at sunsite.unc.edu cd/pub/multimedia/pictures/OTIS/collabs/CROSSWIRE.

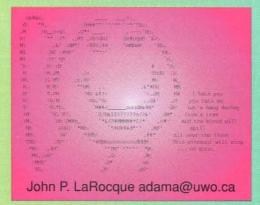
A glut of album artwork from record label 4AD can be found via anonymous ftp at jhuvm. hcf.jhu.edu; login as 4ad-pics and use your e-mail address as the password. The image shown below is titled bellypc 1.

# Online Life-Ring

Getting e-mail through even to easy targets like BIX or CompuServe has sent some surfers to the bottom. Though the Nicolas system has been taken offline, an alternate front-end solution is now available. Point your gopher to gopher.gsfc. nasa.gov, choose networking, then e-mail from-to information to learn about communicating to and from a total of 22 service providers. (For closing info on Nicolas, telnet dftnic.gsfc.nasa.gov and login as dftnic.)

# More MUD Slinging

So you've heard about MUDs and are now ready to experience one? Drop by *Usenet* newsgroup rec.games.mud.announce – the surf shop of virtual worlds – for all your MUDing needs. Here, you'll find the MUD FAQ (listing answers to frequently asked questions), which is regularly posted and updated. You'll also uncover the MUD List – net-surfer Scott Goehring's up-to-date masterpiece of addresses for over 400 publicly available MUDs. Best of all, you'll uncover announcements of new MUDs as they're starting up, so you'll be able to catch the latest wave while it's still only a ripple!



.sig file of the month

# Thanks to the Wired 2.02 Surf Team

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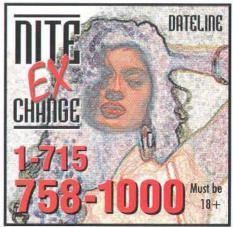
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# Diver <mark>Net</mark> free

The world's premier internet system is now online, offering you access to computers around the world!





# Advertising

◄ 74 TCI mogul John Malone, has promised to bring a new generation of smart cable converter boxes to the tops of televisions everywhere. When all video is digitized, encoding and tracking all the ads becomes a snap.

That means a Bell Atlantic/TCI system would be technically capable of offering its customers not just pay-per-view but TV-sans-ads. How many viewers would be willing to pay their local cable system an extra five or ten bucks each month not to see any advertisements? By smoothly regulating the flow of the digital images, the television programs will run seamlessly so that viewers won't even notice the missing ads.

With just a tiny bit of technical finesse, a Bell Atlantic/TCI could even rig the converters so Negroponte has argued that the future of advertising will see a total inversion of traditional practice: Instead of advertisers soliciting response, they'll respond to solicitations by potential customers.

But what about the nature of the advertisements themselves? Are ads destined to be little more than the shards of targeted databases mating with personal agents and ingenious viruses infecting the Net? More likely, we'll see advertisements imitate the principles that have enabled Nintendo and Sega to redefine American pop culture. Advertisements will feel and play like visual conversations, video games, and simulations.

To be sure, these commercials will feel nothing like the faux interactivity that pervades the ads on, say, Prodigy. Prodigy's model of interactivity seems to be designed around the remote control clicker – tap a button, see another

Memetics offers a new paradigm to explain pop culture. Apparently, more agencies are comfortable drawing inspiration from a double martini than a double helix. Forget demographics and psychographics. Think memegraphics.

that subscribers could program what kind of ads they wanted to receive – auto, beer, perfume, jeans – and screen out the ones they didn't – tampons, public service announcements, detergents. Needless to say, a media distribution company could charge advertisers a pretty penny to identify the households that wanted to see their offerings.

As telephone and cable companies merge and smarten up their networks, they inevitably become powerbroker intermediaries between the advertisers and the viewers. They become the royal gateways for the next generation of advertising.

But what does this next generation of advertising look like? Obviously, the rise of smart networks and programmable agents/filters means that advertisements will become more targeted and selective. Databases will drive many ads over the Net, with smart databases responding to queries by curious consumers. Advertisers and buyers will negotiate for information over the Net. Indeed, Wired senior columnist and MIT Media Lab Director Nicholas

screen. This is the laziest possible style of user involvement...click...click....

How about, as multimedia designer Robert Fulop suggests, a Prodigy that would let you interactively custom design your Domino's Pizza in color, on screen, and online – sausage, mushrooms, extra cheese on half – and then automatically routes your order to the nearest Domino's for delivery?

Ads would become software seducers, enticing and guiding customer interaction. Advertising, information, and transaction would all begin to blur. Interactive ads can evolve into compelling direct-response environments – informative, intimate, and immediate.

The same holds true for games. Sega already offers a video game featuring the 7-Up Spot as the lead character, but that's merely using the medium for promotion.

Think instead of designing games that blend the properties of the medium with the advertising message. It's easy to imagine McDonald's producing an educational video game called, say, Burger Hunt, for its kiddie customers. Ronald McDonald gives the player a random quantity of 'McDollars' and the child has to maneuver, Mario-like, through mazes of Hamburglars and other McDonald-Land obstacles to buy and bring back just the right number of burgers, fries, shakes, and McNuggets – plus change – to win.

Such a game would literally reward kids for buying virtual McBurgers. No doubt, PCMCIA card versions of the game will print out redeemable McDonald's coupons and gift certificates, or plug directly into McDonald's cash registers. The point is simple: Games are dual purpose – they create compelling experiences and get customers even more involved with the product. Coca-Cola, Toys R Us, PepsiCo, and Nabisco may all ultimately design games to imprint their products onto the neurons of their younger customers. What advertising on MTV was to the youth market of the last decade, video game advertising will be to the youth market of the next.

Similarly, Chrysler or Toyota might develop VR driving games for adolescents and adults to promote their cars. If for no other reason than to differentiate themselves, sophisticated advertisers will invest more capital and creativity in high-involvement media.

American Express, Fidelity, and other financial go-betweens have an enormous stake in garnering high-net-worth investors. Imagine interactive ads built around expert systems that offer custom-calibrated investment advice. A potential customer might answer a series of guestions - or be confronted with a set of investment options - and the responses would lead to a digital description of the investor's risk-profile. Based on that profile, the appropriate financial vehicles would be put on display: venture capital and small-cap stocks for the major risk-seekers, mutual funds and municipal bonds for the more financially faint-of-heart. Tap on the keyboard or utter the right voice command and the transaction is complete. This type of expert-systems model would easily translate to travel planning or finding that perfect wedding present.

So, the focus of advertising design shifts: Ads become a medium of collaboration between potential buyer and potential seller. Indeed, if the interaction and information is crafted appropriately, even the term "advertisement" becomes passé, replaced by a new genre of commercial communication.

# Is There a Shopping Gene?

As sweeping and pervasive as the media technology revolution may be, the pace of discovery and innovation in biotechnology is even more

# call for entries NEW Cites NEW Visions

The personal computer is more than 15 years old. Until now though, when creative people have used computers to create works of art, the output medium has usually not been the computer itself. As artists become more familiar with the medium, we are beginning to see

truly original works, which could only have been created on computers and, more importantly, can only be viewed on computers.

To encourage creative artists using the computer for original works, Voyager, Wired and Interval Research announce the New Visions, New

Voices competition. The search is on for new works by digital artists who are ready to explore and expand these dynamic new media.

# Digital works: Any Length Any Format Any Subject

3 Awards of Merit \$5000 each Deadline June 30, '94. To receive an

entry form and for more info, call or send mail. The Well: "muchomedia conference," Internet Gopher Site: gopher.well.sf.ca.us

Arts Folder, Wired Infobot: email infobot@wired.com with the words "send visions" in the message. Or call Voyager 212 431 5199.

VOYAGER



# Advertising

startling. The University of Minnesota studies of identical twins – in which identical twins separated at birth frequently smoke the same brand of cigarettes and buy the same brands of clothing – strongly indicate that understanding the human genome could offer insights into the marketplace.

Is it bizarre to envision a time when advertisers and marketers conduct focus groups filled with people of certain genotypes to test their predisposition toward certain advertising campaigns? Wouldn't an advertiser want to know if shy customers respond more openly to male or female salespeople or quiet versus noisy advertising campaigns? In an era of targeted marketing, might not the human genome be the best database of all?

Of course, the real future of advertising and marketing may rest in the new ecology and the interrelationship between genes and memes. The 'meme' was invented over fifteen years ago by Oxford zoologist Richard Dawkins as an ingenious way to explain cultural change.

Even though the concept of memes represents the boldest and most provocative theory of how new ideas spread, the word has somehow managed to avoid capture by the advertising, media, and marketing communities. That's too bad: Memetics offers a new paradigm to explain pop culture. Apparently, more agencies are comfortable drawing inspiration from a double martini than a double helix.

"Examples of memes are tunes, ideas, catchphrases, clothes fashions, ways of making pots or of building arches," Dawkins writes in *The Selfish Gene*. "Just as genes propagate themselves in the gene pool by leaping from body to body via sperm or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain."

What are the memes that urge us to purchase and consume? How do you splice two or three seemingly disparate memes? What is the appropriate medium to transmit certain memes? VCR? TV? CD? Radio? Do some cultures diffuse advertising memes more efficiently than others? These are the kinds of questions that the meme paradigm will force advertising agencies and their clients to address explicitly. Forget demographics and psychographics. Think memegraphics.

Indeed, the future of advertising may draw design inspirations less from the emerging networks of new media technology than from the powerful metaphors of genetic and memetic engineering.

◄ 74 pay-per-view basis. About 25 cents worth of advertising enters your home every time you watch a half-hour prime-time television show today. That should give you some idea of what a programming provider would have to collect to make it an economic proposition. Or you might choose to pay a flat fee for a wide variety of choices, similar to the way cable services are sold today.

If you aren't in the mood to pay cash for your entertainment, you could choose to receive advertising instead. The right way to think about television advertising in the Interactive Age is to think of it as video mail.

Only there's a big difference between the video mail you'll be getting in the future and the 200 pounds or more of unsolicited mail you get every year in your postal mailbox. You don't own your postal mailbox, and you can't prohibit hungry marketers from barraging you with every catalog or snap-pack letter they feel like paying for. Empty houses get mail, and you will too.

But a video dial-tone service of your choice will maintain your video mailbox to your own specifications. Want no more than three commercials a day? You're the boss. Never want to hear from Rodeway Inns again? Okay, boss, done.

For their part, companies will have a new advantage: the computational power to remember every detail of a customer's transaction history. (It's about time. After all, customers have always been able to remember their interactions with companies.) Manufacturers and service providers are bringing to market an increasing assortment of highly customized goods and services – "customer-ized" products, individually tailored to meet individual needs, one customer at a time.

The rapidly declining effectiveness of mass media, coupled with the rise of addressable, interactive media – one-to-one media – makes one-to-one marketing necessary for any competitor to survive and prosper in the Interactive Age.

The new rules of engagement governing business competition will focus on customer share rather than market share. Success in this new environment will require:

- Producing a high-quality product and service, because share-of-customer strategies are based on repeat purchases and customer referrals
- Developing long-term relationships with customers, in order to increase individual customers' lifetime values
- Differentiating among customers, so as to allocate the most effort and resources to those customers who are the most valuable, and
- Initiating, maintaining, and improving dialogues with individual consumers, abandoning the oldfashioned advertising monologues of mass media.

So if these are the new rules, what kind of "advertising" will characterize the one-to-one, interactive future? For starters, interactivity may mean the end of those obnoxious television spots that seem designed to irritate viewers into remembering the products. "Ring around the collar" and "Aetna, I'm glad I met ya" are doomed. Good riddance.

In the one-to-one future, three forms of advertising will dominate interactive media:

- Invitational advertising: Successful advertisers will have to stop their frenetic shouting at customers, and will instead offer polite invitations designed to initiate or continue individual customer dialogues. Starting a dialogue, either with a current customer or with a potential new customer, will be the primary goal of any marketer hoping eventually to sell products or services. Advertisers will no longer find it beneficial to irritate viewers into remembering their brands. Not only is this a bad way to begin a dialogue, but it is very likely that in the interactive future a consumer who feels irritated with a certain ad or brand will be capable of forbidding that brand from appearing on his own set again.
- Solicited advertising: On the other hand, there will indeed be a booming market for advertising-on-demand. Consumers will look up advertising whenever they wish to begin thinking about buying something, or when they want to compare prices, features, or services. We have two principal forms of solicited advertising today, both in print: classified ads and Yellow Pages, the two largest and fastest growing advertising vehicles. Electronic, interactive versions of these media will represent a significant form of advertising in the one-to-one future.
- Integral advertising: As customers opt out of traditional shotgun advertising (why? because they can), advertisers will, more and more, include brand messages as integral parts of entertainment and information programs. Product placement in movies is already big business, with clear distinctions in placement fees between background use and, say, handling by the hero. In the future, we will see a greater fusion of publicity, advertising, and careful product placement in nearly every media outlet.

The changes in advertising will challenge those creative types charged with marketing "badge" products, from athletic shoes and beer to automobiles and fashion accessories. Mass media advertising pitches to people who are not now, and never will be, customers. This is not a mistake. After all, it's no fun to pay \$200 for a pair of shoes, or \$40,000 for a car, if your friends haven't heard of the brand. Does this ensure some continuing home for mass media advertising?

Some say the mass marketing game is changing. They're wrong. That game is over, and the rules for an entirely new game are only just now being written. But one thing is certain: In the one-to-one future, the consumer will be the one in the driver's seat, and the advertiser will be thumbing a ride.

- Don Peppers and Martha Rogers

# DMV

**◄ 88** California title to Texas, they may not know what a California title looks like for a vehicle purchased in 1988, because California has changed the title document three times since then," says Goleman.

Although the states are working on a standardized title form, in a few years it will be obsolete when AAMVANET expands its horizon and begins tracking automobiles as well. The electronic system will make fraud more difficult to commit and easier to track down.

As integration between state DMVs gets better, expect to find more and more people getting their driver's licenses suspended or simply not renewed for incidents that happened outof-state. Massachusetts, for example, won't renew a person's driver's license if any other state has revoked that person's operating privileges. After all, says Lewis, it wouldn't be in the interest of public safety for Massachusetts to renew the driver's license of a person who had been fined for speeding in Pennsylvania and had then refused to pay. But Massachusetts won't get into the nitty gritty of what is a suspendible offense and what isn't: Any revocation in any state is grounds for non-renewal. Bay State drivers had better be careful about returning Wisconsin library books on time.

New technology and public policy pressures will only increase the power we are now ceding to the DMV. Soon, for example, the nation's DMVs will be the primary place for citizens to register to vote, thanks to the so-called "motor voter" bill signed last spring by President Clinton. Even though the bill applies equally to welfare and other state agencies, its name betrays the fact that most of its sponsors, and detractors as well, expect DMVs to be the primary place where it is implemented.

State DMVs are also exploring a new kind of driver's license that will make it all the more attractive to merge databanks between various state agencies. The driver's license of the near future will look a lot more like a credit card than the laminated Polaroid snapshots used by most states today. But unlike a Visa or Mastercard, the driver's name, number, and date of birth won't be embossed in raised letters: Instead, they will be fused into the card's plastic with a thermal printing process, making them nearly impossible to alter. A digitized copy of the driver's photograph and signature will be similarly imprinted, in addition to being stored inside the state's databank.

Another advantage of storing a person's digitized photograph online, says Lewis, is

that the image can be electronically compared with other people's pictures. Software is now under development that will scan through the entire DMV database, once it is online, and search for two driver's licenses that have pictures of the same person. Such software, Lewis says, should be operational in Massachusetts within two years.

On the back of the new driver's license is a barcode and a magnetic strip. The states are now establishing standards, so that every state will store its computer-readable information in a compatible format. The barcode will likely contain an identifier that will key into AAMVANET's computer. The magstrip will additionally hold the driver's name, driver's license number, address, and demographic information such as age, height, and sex.

The beauty of using a standard credit-card license, Lewis says, is that "the third track can be read by an ATM." Eventually, states might join the cash teller networks, allowing people to pay their parking tickets, or view their dri-

Lawmakers around the country were realizing that DMVs were good for controlling people as well. Programs to block driver's licenses were so effective that legislatures started looking for other ways to exercise this newfound power.

ving records using the same machines that they now use to get cash. Such a system would use the ability of the ATM to read the magnetic strip on the back of the driver's license, use the network to verify eligibility in the benefit program, and use the ATM again to dispense cash. The state wouldn't use the ATM network to access a person's bank account – at least, not at first. On the other hand, if a person owes the state money, and that same person has a savings account in a bank that's chartered by the state...well, who knows what some lawmaker might dream up?

The image and signature won't be stored digitally on the card – there's not enough room – but they will be JPEG compressed and stored on the state's mainframes. Indeed, not storing the picture on the card dramatically reduces the chances that the digital picture can be compromised. When a driver goes in to renew a license, the Registry official will swipe the driver's license through a magnetic strip reader and a picture of the person –

pulled from the DMV's databank - will pop up on the screen.

But it won't stop there. "The Department of Welfare could use this as an ID card," says Lewis. The card could also be used to issue unemployment benefits or food stamps. Increasingly, the card won't be a driver's license: It will be a state identification card that will also give some people permission to drive. The card might even become the National Health Care card as well – unless legislation is added to Clinton's health care act that would specifically prohibit the new National Health Care Card from having a "dual-use" – such as allowing you to drive.

Eventually, financially strapped states will probably develop ways to resell their databases back to their citizens. One idea is a low-cost "consumer identification verification station" that shopkeepers and restaurateurs could purchase to verify the identities of people trying to cash checks or pass credit cards. A shopkeeper would borrow a person's driver's license, swipe it through a magnetic strip reader, and a photo of the person would appear on a little screen. The few states that have laws against the dissemination of such records will probably pass new ones, especially in light of the cash potential.

And if you don't pay your library fines? The state could always void your ability to write checks or pass credit cards, in addition to pulling your driving privileges.

Our Founding Fathers never could have envisioned today's driver's license. It would have been inconceivable to likes of Washington, Adams, and Jefferson that one day travel between a person's home and work, or between nearby cities, in a carriage owned by that person, would be transformed from a right into a privilege to be granted and revoked at the pleasure of the state.

After all, the right to travel between states is guaranteed by Article 1, Section 9 of the United States Constitution. And while taking away a person's driver's license does not take away that right, it can make it essentially impossible to exercise.

In building a country largely dependent upon the automobile and devoid of public transportation, we have inadvertently created a lever that gives state governments a heretofore unimaginable power to affect people's lives by simple administrative action. In the coming years, more and more states will seize upon that power as a way of enforcing social policy, balancing their budgets, and cutting costs. Indeed, in a few years, states that don't exercise this kind of control over their citizens will seem foolish. Or will they?

# **Mao Bell**

■ 103 iment in free enterprise, both by the government of the PRC and by an especially fatuous breed of Western free-market evangelist – people who think that a free market will lead to a free society. This gets us into some awkward questions of just what we mean by the word "free."

I wasn't able to get out to any of the slave labor camps, where many Chinese are hard at work cranking out exportable trinkets, but I did meet plenty of real-life indentured servants. After June 4th (which is how the Chinese always refer to the crushing of the Tiananmen demonstration) the government instituted a new program whereby any student who graduated from college was deemed to owe the government five years of service, at a place and in a job to be chosen by, you guessed it, the government. Needless to say, this is a handy way for the government to control the behavior of that frisky Tiananmen generation, while also giving government enterprises, and Sino-foreign joint ventures, a handy recruitment system.

Shenzhenese are proud of their railway terminal, which is a good quarter-mile long and ten stories high, clad in mirrored glass. Centered high on the side of the building, enormous in red neon, are the Hanzi characters for Shen Zhen, drawn in a rather spidery hand. Supposedly the calligrapher was none other than Deng Xiaoping. He launched the SEZ thirteen years ago, then swung through recently and spoke the immortal words "I like this," which has led to the founding of more SEZs in other parts of China.

I wandered through the hall where passengers line up to buy tickets, if they haven't already bought them from the cellphone-brandishing wise guys loitering outside. The space was regularly interrupted by heavy structural pillars, three or four feet on a side, sheathed in white stone.

A gaping hole had been kicked in one of them, revealing that the "pillar" was actually a column of air with several naked strands of inch-and-a-half-thick rebar wandering through it. Holes had been kicked in other pillars by inquisitive passengers, affirming that the builders had not bothered to pour a single tablespoon of actual concrete.

Paul Lau, a Hong Kong-based photographer, accompanied me. "Corruption," he said, shaking his head in exasperation like a farmer who's just discovered a cutworm infestation in his field.

Corruption in China is no secret, but the way it's covered in Western media suggests that it's just an epiphenomenon attached to the government. In fact, corruption is the government. It's like jungle vines that have twined around a tree and strangled it – now the tree has rotted out and only the vines remain. Much of this stems from the way China is modernizing its economy.

If you thought zaibatsus were creepy, if Singa-

pore's brand of state-backed capitalism gives you the willies, wait until you see the Sino-foreign joint venture. The Russians, in their efforts to turn capitalist, have at least tried to break up some of the big state monopolies and privatize their enterprises – but since China is still Communist, there's no reason for any of that nonsense. Instead, foreign companies form joint ventures with enterprises that are still part of the government – and, of course, everything is part of the government.

n every block you see an entrepreneur sitting at a sidewalk card table with one or two telephones, jury-rigged by wires strung down an alley, up the side of a building, and into a window. There is a phone book, a price chart, and a cigar box full of cash (in Shenzhen, always Hong Kong dollars). Some fastidious operators have a jar full of mysterious disinfectant with which they wipe down the mouthpiece and even the buttons after each customer is finished. Most of these enterprises also feature a queue of anywhere from one to half a dozen people. The proprietor will step in and cut long-winded customers off, especially if someone in the queue makes it worth his while.

All of the phone wiring is kludgey. It looks like everyone went down to Radio Shack and bought reels of phone wire and began stringing it around, across roofs, in windows, over alleyways. Hundreds of wires explode from junction boxes on the sides of apartments, exposed to the elements.

I was checking out some electronics shops along one of Shenzhen's wide avenues. Above the shops were dimly lit office spaces housing small software companies or (more likely) software departments of Sino-foreign joint ventures. If there was a Chinese silicon valley, this was it. I wandered into an alley – the Silicon Alley, perhaps – and discovered a particularly gnarly looking cobweb of phone wires. Paul Lau started taking pictures of it. Within moments, a couple of attentive young Chinese men had charged up on bicycles and confronted him.

"Are you a reporter?" they demanded.

"No, I'm an artist," Paul said, leaving them too stunned to make trouble. The lesson I learned from this is that a sophisticated Hong Kong Chinese knows how to use the sheer force of culture shock to keep his mainland cousins at bay. The Shenzhenese are pretty worldly by Chinese standards, but compared to the Hong Kong Chinese, who may be the most cosmopolitan people on earth, they are still yokels. This cultural disparity is about the only thing Hong Kong has going for it as 1997 approaches; but more about that later.

Everyone has a pager. Expensive models have LCD screens that can display Hanzi characters. Cheap ones display a few digits. If you have one of these, you carry a tiny chart listing a couple of hundred of the most common Chinese surnames, each

one with a numerical code. When you're paged, you read the number off the screen and refer to the chart to find the name of the caller.

If you own stock on the Shenzhen exchange, you can cut a deal with your pager company that will cause the price of that stock to appear on your pager twice a day, at 10:00 and 4:00. And the pager doubles as an alarm clock; your company will give you a wake-up page every morning if you request it.

Even people who carry cellphones carry pagers, which confused me until I found out that most of the cellphones I was seeing aren't really cellphones at all; they are CT2 phones, which are cheaper and operate over a much shorter range. On a CT2, you can call out but you can't receive calls, so you have to carry a pager. To cover a metropolis with CT2, tens of thousands of base stations would be needed. Coverage in Shenzhen is still spotty. When you see half a dozen young men loitering on the front steps of a building shouting into their prawns, you know there must be a CT2 station inside.

oughly speaking, Shenzhen is the southern anchor of a crescent of development running along the vast semicircular region that bulges into the South China Sea. At the northern end of the crescent lies Shanghai, the largest city in China, and, until the Communist takeover, the only Chinese city that could compete in wealth and sophistication with Hong Kong.

Motorola runs one of the two cellphone networks in Shanghai. The local chief is a young American named Bill Newton, who came here a few years ago with two other people and worked around the clock at first – like new immigrants, he says, who've just come to America and have nothing to do but work. Now he's managing 55 employees; he's the only American. He thinks everyone should want his job: "To be in one of the fastest growing companies in one of the fastest growing sectors of the fastest growing economy in the world – how many times in your life is that going to happen?" In the context of Shanghai, "fast growing" means, for example, that cellular phone service is growing at 140 percent a year and pager use at 170 percent a year.

Motorola's offices are in the international center west of downtown Shanghai – the modern, highrise equivalent of the Western enclaves where capitalists used to do business in the old days. It's got a Shangri-La luxury hotel, it's got modern offices identical to those you'd see in any big American city, it's got living quarters with purified water. Newton and I got in a taxi and took a long drive to the head-quarters of the Shanghai Post and Telecommunications Administration (PTA) – Mao Bell, if you will.

Driving in Shanghai is like shouldering your way through the crowd at an overbooked trade convention. There's never any space in front of your vehicle that is large enough to let you in, so you just ooze along with the traffic, occasionally claiming a few

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extra square yards of pavement when the chance presents itself. I'm hardly the first Westerner to point this out, but the density of bicycle and foot traffic is amazing. I'm tempted to write that the streets are choked with bicycles, but, of course, the opposite is true: All those bicycles are moving, and they're all carrying stuff. If the same stuff was being moved on trucks, the way it is in, say, Manhattan, then the streets would be choked.

Everyone is carrying something of economic value. Eviscerated pigs slung belly-up over the rear tire; bouquets of scrawny, plucked chickens dangling from racks where they get bathed in splashed-up puddle water; car parts, mattresses, messages.

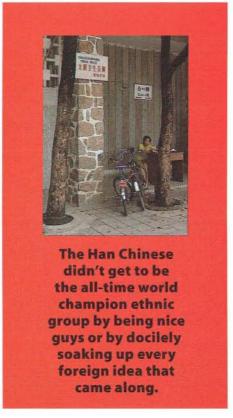
In network jargon, the Chinese are distributed. Instead of having One Big Enterprise, the way the Soviets did, or the way we do with our Wal-Marts, the Chinese have millions of little enterprises. Instead of moving stuff around in large hunks on trucks and trains, they move it around in tiny little hunks on bicycles. The former approach works great in say, the Midwestern US, where you've got thousands of miles of nearly empty interstate highways and railroad lines and huge chunks of rolling stock to carry stuff around. The latter approach works in a place like Shanghai.

The same problems of distribution arise in computer networks. As networks get bigger and as the machines that make them up become more equal, the whole approach to moving information around changes from centralized to distributed. The packetswitching system that makes things like Internet work would be immediately familiar to the Chinese. Instead of requisitioning a hunk of optical fiber between Point A and Point B and slamming the data down it in one big shipment, the packet data network breaks the data down into tiny pieces and sends them out separately, just as a Chinese enterprise might break a large shipment down into small pieces and send each one out on a separate bicycle, knowing that each one might take a different route but that they'd all get there eventually.

Mao Bell is responsible, among other things, for setting up such data networks in China. The Shanghai headquarters is on the waterfront of the Huangpu river between the Shanghai stock exchange and a tall hotel used during the war by the Japanese as a high-rise concentration camp. A woman sits in the tiny lobby with her telephone and her jug of disinfectant, and allows you to call upstairs to announce yourself. A tiny, rickety elevator descends, hoists you up a few floors, and deposits you in a long corridor without artificial light. Some illumination enters through windows and glances down the shiny floor, but it's the gloomy steel-gray light of a northern industrial city. You'd never know that Mao Bell takes in over US\$7 billion a year and that revenues are growing by something like 60 percent a year.

A bit of a spelunking expedition through these corridors takes you into a classic communist-style

meeting room, the kind of place Coleridge might have been thinking of when he wrote of "caverns measureless to man." In this part of the world, the heavy hitters show up for meetings with large retinues of underlings, and all of them have to have a seat at the table, so the tables go on for miles. I established a foothold in a corner near the door and was met by Gao Kun, director of the import office of the Shanghai PTA, comfortable in a short-sleeved shirt. Gao, bless him, was the only government official who would talk to me the whole trip - the PRC was still pissed off at the Great Hegemon (as they now call the US) about that incident in the Persian Gulf a few months back when our guys stopped and boarded a Chinese freighter allegedly full of chemical warfare ingredients. They found nothing.



Gao calmly rattled off a fairly staggering list of statistics on how rapidly the phone system there is growing - half to three-quarters of a million lines added per year for the foreseeable future. All of their local exchanges are webbed together with fiber, and they're running fiber down the coast toward Shenzhen. They're setting up packet-switching networks for their customers who want them banks, import/export houses, and the like. The cellular and CT2 networks are also growing as rapidly as technology allows. He buys scads of highbandwidth technology from the West and is actually trying to set up a sort of clearinghouse near Shanghai where Western manufacturers could gain access to the potentially stupendous Chinese market through a single point, instead of having to

traffic separately with each regional PTA.

Gao is baffled by the fact that the US makes all the most advanced technology, but our government won't allow him to buy it. He asked me to explain that fact. I didn't suppose that haranguing him about human rights would get me anywhere, so I mumbled some kind of rambling shit about politics.

He explained to me, through his interpreter, that the slogan of Shanghai PTA is "destroy the users on the waiting list." Indeed, it's the job of people like Gao to extend the net into every cranny of the society, making sure everyone gets wired. When nobody had phones, he says, nobody really missed them; the very few people who had them in their homes viewed them primarily as a symbol of status and power. Now, 61 percent of his customers are residential, everyone views it as a basic necessity of life, and Gao's company has to provide them with more services, like direct dial, pagers, and so on. Cellphones, he said, are so expensive that they're only used by businessmen and high-ranking officials. But the officials are uneasy with the whole concept because they have to answer the phone themselves, which is seen as a menial chore. I told him that in Hong Kong, businessmen walk down the streets followed at a respectful distance by walking receptionists who carry the phones for them. Gao thought that was pretty funny.

n one Chinese city, a woman spends all day running a sidewalk stand and keeping one eye on a construction project across the street. The construction project is backed by a couple of people who were running a software counterfeiting operation to the tune of some tens of millions of dollars until they got busted by Microsoft. They hid their money and have been sinking it into the real estate project. Microsoft is paying the woman a lot of money (by the standards of a Chinese sidewalk vendor) to watch the site and keep track of who comes and goes. She has a camera in her stand, and if the software pirates ever show up there and she takes a picture of them, she gets a whopping bonus, plus a free trip to the United States to testify.

Microsoft runs an office in Hong Kong that is devoted to the miserable task of trying to stop software piracy in Asia. In addition to running their undercover operation in the sidewalk stand, they are targeting a number of operations in other countries, which probably provides a foretaste of what's going to happen in mainland China a few years down the road.

Most East Asian countries have sort of a stolen intellectual property shopping mall where people sit all day in front of cheap computers swapping disks, copying the software while you wait – the vaunted just-in-time delivery system. After a few of these got busted, many switched to a networked approach. One guy in Taiwan is selling a set of 7 CD-ROMs containing hundreds of pirated programs. He

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has no known name or address, just a pager.

Taiwan, the most technologically advanced part of Greater China, makes a lot of PCs, all of which need system software, so there the name of the game is counterfeiting, not pirating. MS-DOS and Windows are, naturally, the main targets. Microsoft tried to make the counterfeiters' job harder by sealing their packages with holograms, but that didn't stop the Taiwanese – they made a deal with the Reflective Materials Institute at, you guessed it, Shenzhen University, which cranked out hundreds of thousands of counterfeit holograms for them.

It often seems that, from the point of view of many entrepreneurial souls in East Asia, the West's tight-assed legal system and penchant for ethical dithering have left many inviting niches to fill. Perhaps this explains their compulsion to enter such perfectly sensible fields as driftnet fishing, making medicines from body parts of nearly extinct species, creative toxic waste disposal, and, above all, the wholesale, organized theft of intellectual property. It's not just software, either – Indonesia has bootleg publishers who crank out counterfeit bestsellers, and even Hong Kong's Saturday morning TV clown wears a purloined Ronald McDonald outfit.

This has a lot to do with the collective Chinese approach to technology. The Chinese were born to hack. A billion of them jammed together have created the world's most efficient system for honing and assimilating new tech (they actually view Americans as being somewhat backward and slow to accept new ideas - the Chinese are considered, as Bill Newton put it, "not so much early adopters as rapid adopters"). As soon as someone comes up with a new idea, all the neighbors know about it, and through an exponential process that you don't have to be a math major to understand, a billion people know about it a week later. They start tinkering with it, applying it to slightly different problems, trying to eke out hair-thin improvements, and the improvements propagate across the country until everyone's doing things the same way - which also happens to be the simplest and most efficient way. The infrastructure of day-to-day life in China consists of a few simple, cheap, robust technologies that don't belong to anyone: the wok, the bicycle, various structures made from bamboo and lashed together with strips of rattan, and now the 286 box. A piece of Chinese technology, whether it's a cooking knife or a roofing tile, has the awesomely simple functionality of a piece of hand-coded machine language.

Introducing non-copy-protected software into this kind of an environment may be the single most boneheaded thing that American business has ever done in its long history of stepping on rakes in Asia. The Chinese don't draw any mystical distinctions between analog and digital tech; whatever works,

works, and so they're happy to absorb things like pagers, cellphones, and computers if they find that such things are useful. I don't think you find a lot of Chinese expressing hostility toward computers or cellphones in the same way that technophobic Americans do. So they have not hesitated to enshrine the pager, the cellphone, and the 286 box in their pantheon of simple, ubiquitous technology, along with the wok, the bicycle, and the Kalashnikov assault rifle.

While avoiding technophobia, they've also avoided techno-fetishism for the most part. They don't name their computers "Frodo," and they generally don't use them to play games, or for anything more than keeping the accounts, running payroll, and processing a bit of text. In China, they treat computers like they treat dogs: handy for a few things, worth having around, but not worth getting overly attached to.

Shanghai's computer stores were all completely different. One place had a pathetic assortment of yellowed stuff from the Apple II Dynasty. Another specialized in circuit boards, catering to do-it-yourselfers. There were several of what we'd call box movers: stores crowded with stacks of brand-new 486 boxes and monitors. And I found one place hidden way off the street in a giant old Westernstyle house, which I thought was closed at first because all the lights were off and no one seemed to be there. But then people began to emerge from the shadows one by one and turn on lights, one fixture at a time, slowly powering up the building, shedding light on an amazing panoply of used computers and peripherals spanning the entire history of the industry. In more ways than one, the place was like a museum.

Spend a minute or two watching a Chinese person enter Hanzi characters with a Western keyboard, and you'll understand that the Chinese won't ever use computers as much as we do, or at least in anything like the way we use them, because - to put it in a nutshell - Chinese is a lousy language for Scrabble. The most popular system of text entry works like this: the user types in the Pinyin version of a word (that is, its spelling in the Roman alphabet). All of the Hanzi characters so transliterated then appear on the screen - sometimes there can be dozens - and the user chooses the desired one by punching in its number on the list. Then it appears on the screen - sort of. CRTs don't have enough resolution to display the more complicated characters, so the screen fonts consist of simplified versions, and the reader has to puzzle out the identity of a character from its context. Imagine how much time you'd spend computing if you had to transliterate each word into Thai, type it in on a Thai keyboard, pick the right word from a list, and then view the results through a sheet of frosted glass that blurred most of the letters, forcing you to guess the words from their general shape and context.

Shanghai Ikarus Ltd. is run by one Gu Guo-An, who has put in some time at Stanford and Xerox PARC. Its bread and butter is desktop publishing for the Shanghai business community, but in the back rooms Gu is up to more interesting things: his company is the first in the Chinese-speaking world to develop outline fonts, both for the traditional system still used in Taiwan (some 13,000 characters) and the simplified system of the PRC (6,763 characters). They're putting together a set of TrueType characters now – all day long, the employees in the back rooms are busy tugging those pesky control points around the screens of brand-new Mac Centrises.

Forget about PCs with Western keyboards hooked up to modems. When you combine a mind like Gu's with the advent of pen-based computers, which work with non-Scrabbleophilic languages; PDAs capable of shooting messages back and forth via infrared or radio; the rapid growth of the phone system, both wired and wireless; and the obvious Chinese love for pagers, portable phones, or any other gadget that makes them connected, suddenly the future of computers there begins looking very different from the Western approach.

If you look a decade or two down the road, it's possible to imagine a future in which non-Westernized Chinese finally have the opportunity to use computers for the highest and best purpose we have ever found for them: goofing off. This is terribly important, because goofing off with computers leads to hackers, which leads to the hacker mentality, which takes us to other interesting places.

Whether the Chinese are interested in goofing off is another story. I saw a lot of computers in China, but I didn't see a single computer game. The idea of sitting by yourself in front of a machine doesn't seem to do much for them; it does not gibe with their concept of having fun. It's not a culture that encourages idiosyncratic loners.

There are plenty of historical examples to back up the proposition that we won't see any Hacker Ethic in China. The country has a long history of coming up with technologies before anyone else and then not doing a lot with them; a culture 5,000 years old prefers to bend new technologies to its own ways.

got around Shanghai in a nondescript white Ford. Because of its high fuel consumption, the driver called it the "Oil Tiger." Whenever it ran low, he was compelled by certain murkily described safety regulations to leave me a block away from the fuel pumps while he filled it up, which imparted an air of drama to the procedure.

One day, on the outskirts of Shanghai, I stumbled across a brand-new computer store with several large floral arrangements set up in front. A brass plaque identified it, imposingly enough, as the Shanghai Fanxin Computer System Application Technology Research Institute. Walking in, I saw the usual rack full of badly printed manuals for pirated

software and a cardboard box brimming with long red skeins of firecrackers. The place was otherwise indistinguishable from any cut-rate consumer electronics outlet in the States, with the usual exception that it was smaller and more tightly packed together. There were a couple of dozen people there, but they weren't acting like salespeople and customers; they were milling around talking.

It turned out that they had just opened their doors something like an hour before I arrived. I had accidentally crashed their opening-day party. Everyone stood around amazed by their good fortune: a writer for an American technology magazine showing up for their grand opening!

Dai Qing, the director, a young blade in an oversized suit, beckoned me into the back room, where we could sit around a conference table and watch the front through a large window. He bade a couple of females to scurry out for slices of cantaloupe and mugs of heavily sweetened coffee, and gave me the scoop on his company. There are 21 employees, 16 of whom are coders. It's a pure entrepreneurial venture - a bunch of people pooled their capital and started it rolling some three years ago. The engineers mostly worked in state enterprises or as teachers where they couldn't really use their skills; now they've developed, among other things, an implementation of the Li Xing accounting system, which is a standard developed in Shanghai and used throughout China.

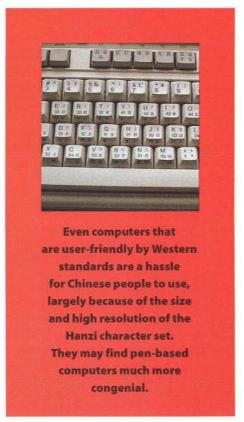
The engineers make some 400 yuan per month, which works out to something like \$600 a year at the black market exchange rate. This is a terrible salary – most people in Shanghai can rely on making four times that much. But here, the coders also get 5 percent of the profits from their software.

You can't pick out the coders by looking at them the way you can in the States. The gender ratio among coders is probably similar. Everyone is trim and nicely but uninterestingly dressed. No extremes of weight, facial hair, piercings, earrings, ponytails, wacky T-shirts, and certainly no flagrantly individualistic behavior. In other words, there's no evidence that being good at computers has caused these people to think of themselves as having a separate identity from other Chinese in the same wage bracket.

By the time I'd gotten out the door, the software engineers had already rolled a couple of dozen strings of firecrackers across the sidewalk. As soon as I jumped out of the way, they started lighting the fuses with their cigarettes (another habit not common among US hackers), and everything went off in a massively parallel barrage, covering the sidewalk in dense smoke and kicking up a blizzard of shredded red paper. Several more coders came out carrying mortars and began launching bombs into the air, holding the things right in front of their faces as they disgorged fireballs with satisfying thuds. The strings of fireworks kept blowing themselves out, so

as I backed slowly toward the Oil Tiger I was treated to the sight of excited Chinese software engineers lunging into the firestorm holding their cigarettes out like fencing foils, trying to reboot the strings without sacrificing eyes, fingers, or eardrums.

ack in Shenzhen, when I'd had about all I could take of the Special Economic Zone, I walked over a bridge across the Shen Zhen and found myself back in the British Empire again, filling out forms in a clean well-lit room with the Union Jack flying overhead. A twenty-minute trip in one of Hong Kong's quiet, fast commuter trains took me through the New Territories, mostly open green land with the occasional grove of palm trees or burst of high-rise develop-



ment, and into Kowloon, where I hopped into a taxi.

On the approach to the tunnel between Kowloon and Hong Kong, stuck in traffic beneath a huge electronic billboard showing animated stock market graphs in white, emerald, and ruby, I gazed into the next lane at a brand-new gray BMW 733i, smooth and polished as a drop of molten glass. Behind the wheel was a Chinese man, affluently fleshy. He'd taken off his suit jacket to expose a striped shirt, French cuffs, the cuff links flashing around the rim of the steering wheel. In the passenger seat to his left sat a beautiful young woman who had flipped her sunvisor down, centering her face in a pool of light from the vanity mirror; as she discussed the day's events with the man, she deftly touched up her Shiseido – not that I would have guessed she

was wearing any, and not that she seemed especially vain or preoccupied. The BMW kept pace with my taxi through the tunnel and then the lanes diverged. I couldn't help wondering what the hell was going to happen to this place when it becomes part of the People's Republic in 1997. Needless to say, a lot of Hong Kong residents are wondering the same thing.

The working class there doesn't speak English, but the computer-owning classes do, and the place is heavily networked. Larry Riley and James Campbell, Australian and Sri Lankan respectively, are the tech reporters for the South China Morning Post, and they've started a magazine called The Dataphile, which lists some 700 BBSes in Hong Kong, most reachable via FidoNet – including boards for Communists, Methodists, Programmers, and Accountants.

Until recently it hasn't been easy for these people to hook into the Internet, but gateways are opening up. Aaron Y. T. Cheung is the executive director of Hong Kong Internet & Gateway Services Ltd., which has just leased a line between Hong Kong and California. If anyone's going to be the informational mogul of South China, it's probably Cheung. He's a compact, solid, sunny, energetic guy, trained at the University of Minnesota, and jammed with so much information about optical fiber, telecommunications policy, baud rates, Chinese politics, packet data networks, and other arcana that he can hardly get the information out of his mouth fast enough.

Now, not to put too fine a point on it, but in a very few years, Riley and Campbell and Cheung, the 700 sysops of the Hong Kong boards, and all of their subscribers are going to go to bed free men and women and wake up subjects of an unimaginably corrupt totalitarian dictatorship whose concept of a legal system is to blow the offender's head off with a revolver and then send the victim's mother a bill for the bullet (27 fen, or about a nickel). Is China going to eat Hong Kong alive, or is Hong Kong going to impregnate its new host with more new memes than it can deal with?

Let's start with the first possibility.

Cheung's got a copy of some 10 Mbytes of traffic from soc.culture.china that appeared between the first hunger strikes in Tiananmen in mid-May and the end of June. Ninety percent of it is from from overseas Chinese in universities and tech companies in the States, who typically act as intermediaries between the Net and their friends in the PRC.

It would be nice to report that the Net played some crucial role in the democratic demonstrations leading up to June 4th, but in Cheung's opinion it didn't create any impact of any kind – fax played a greater role. Still, fax is part of the Greater Network.

Cheung wants to extend the Net into China, and a lot of Chinese badly want him to do it –not because they want to read the latest on alt.sex.

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bondage but because they want to network their offices together, in China and other parts of Asia, without having to lease lines.

But the telcos are part of the government, and there's the rub. The tech he's peddling is just as powerful as the telcos' packet data networks, so an outfit like his, once it gets its hands on leased lines connecting various countries, represents a competitive threat to Mao Bell, and to the numerous other immense Chinese ministries who are setting up networks of their own and trying to compete with Mao Bell. So, given the way business is done in the area, it's not likely that the governments will let him in (to China or any other Southeast Asian country besides Hong Kong) anytime soon.

Cheung doesn't see electronic media exposing a lot of people in China to new ideas. He points out that political change in China tends to come from the bottom up, when the masses go voluntarily and spontaneously into the streets, all echoing and sharing one another's feelings. For reasons already discussed, it's going to be a long time before the Net reaches the Chinese masses. So Cheung doesn't think that electronic communications will cause any political changes in China except insofar as the free flow of information tends, over a long period, to make the economy more productive and lead to the development of a middle class.

The fact is that the Net can only reach people who have imbibed a lot of Western culture already – you can't even enter text unless you know the Roman alphabet. As far as the masses are concerned, the Net might as well not exist – the only important source of Western memes is television. In a sense, this is terrible news, because we all know what bilge television is. At the same time, the peculiar power of Western culture to colonize unlikely places may be the only thing Hong Kong has going for it.

So let's think about the second possibility, which is that Hong Kong, far from being obliterated, will become the informational capital of mainland China – in other words, that the power of media will overcome, or at least balance, the tanks and guns dispatched from Beijing.

People who think that America has a monopoly on gratuitous TV violence have never watched what the Hong Kong stations radiate across the Pearl Delta every night between 7 and 10. Their fake blood technology is decades behind ours, but that doesn't seem to bother this audience. The carnage is, of course, frequently interrupted by ads, which also appeal to folks who are fairly new to the idiot box. In my favorite TV ad, Beethoven's "Ode to Joy" was played as front-end loaders fed boulders into a giant crusher and whole segments of mountainside were blasted into rubble. And the Mitsubishi ads

looked like what you'd get if you hired Leni Riefenstahl to plug consumer electronics.

It works. The parvenus in Shenzhen watch ultraviolent flicks in their rooms at the Shangri-La with the sound turned all the way up, whooping helplessly with laughter, like the Beverly Hillbillies passing a jug of moonshine during a 24-hour *Beavis and Butthead* marathon. And in the devastated landscape between Shenzhen and Guangzhou – beyond the Second Border – countless bulldozer operators spend their days clawing maniacally at the verdant hillsides, their cockpits lined with posters of their favorite Hong Kong starlets, and the horizon is prickly with television antennas.

Some unimaginative sorts have described this as cultural imperialism. When millions of Chinese spend their scant yuan on putting antennas up to pull in snowy programs from Hong Kong, that's us nasty Westerners being imperialistic, you see.

It's not imperialism. It's what happens when a culture with a sophisticated immune system comes into contact, as it inevitably will, with a culture without one. The Chinese have a completely different relationship to the world of ideas than Westerners do - it seems that they either take an utterly pragmatic approach, paying no attention to abstract ideals at all, or else they go nuts with it, the way they did in the Taiping Rebellion (when Chinese Christians went out of control in the 19th Century and sparked a very nasty civil war) and again during the Cultural Revolution (and let's remember that Communism is, after all, another Western import). I'm not sure what happens to such a country when radical Maoism is replaced by the far more seductive meme of Western consumer culture, as purveyed by the Hong Kong television stations.

I don't imagine we'll see anything as dramatic as the Taiping Rebellion or the Cultural Revolution again; I suppose it will be something like what's happening in the States right now: an abandonment of the value system that has traditionally made the society work. This probably won't improve matters in China, and I wouldn't be surprised to see a violent backlash

It can be argued that the same consumer culture is in the process of dragging American civilization down the toilet, making us more nihilistic, less educated, less respectful of our own civilization in general. It's the smallpox of our time – it's hurting us badly, but we survive because we've got some immunities. Nobody over the age of three believes most of what they see on the tube. When we export it, though, cultures get flattened.

The influence of Western culture has a long way to go before it reaches its peak in China, but the early signs of a backlash are already developing. After I left, the government announced it was cracking down on private ownership of satellite dishes and intensified its regulation of the pager and cellphone business. The excuse was that

these things were letting in too much Western culture (thanks in part to Star TV's Rupert Murdoch, who runs five channels out of Hong Kong). As the *Economic Daily*, an official publication of the People's Republic of China, put it: "If China's information system is spread about and not grasped firmly in hand, how can people feel safe?" Of course, one of the major players in these industries is the People's Liberation Army, so it's also largely a turf war; but at some point they'll have to put a stop to the spread of Western culture, in the way that Singapore, Saudi Arabia, and even France have recently tried to do.

The provinces have a lot of power in China. They negotiate with the central government over how much of their tax revenues will be sent off to Beijing. As a result, China's central treasury came within a hair's breadth of running empty in mid-1993, scaring the bejesus out of the government. In order to get the provinces under control they will have to reform their tax system and radically reinforce the power of the central government, which the provinces won't like.

Say what you will about the power of media and of information technology; the fact is that when a few million ravenous peasants come swarming into the cities with AK-47s, all the cellphones and fax machines in the world aren't going to help the people who've been enjoying the good times in the double-bordered free-enterprise wonderland of Guandong Province. The Han Chinese didn't get to be the all-time world champion ethnic group by being nice guys or by docilely soaking up every foreign idea that came along.

The Network is spreading across China, getting denser and more sophisticated with every kilometer of fiber that goes into the ground. We'd like to think of it as the grass roots of democracy, but the Chinese are just as apt to think of it as a finely engineered snare for tying the whole country together even more firmly than its predecessor, the human Net of the Red Guards. Looking at all the little enterprises that have sprung up in Shenzhen to write software and entertain visiting spacemen, it's easy to think that it's all the beginning of something permanent. But a longer historical perspective suggests that it's only a matter of time before the northerners come pouring down through the mountain passes to whip their troublesome southern cousins back into line.

I'm no China expert. But everything I saw there tells me that, in China, culture wins over technology every time. Sometime within the next couple of decades, I'm expecting to turn on CNN (or BBC if I can get it) and see a jittery home videotape smuggled out of South China, showing a heap of smashed and burning cellphones, satellite dishes, and television sets piled up in a public square in Shenzhen, and, as backdrop, a giant mural portraying a vigorous new leader in Beijing.

# Colophon

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# Drugs of choice: Vitamin C, Spray Mount, Garlic.

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Subject: Speech recognition

In contrast to the gain in graphical richness of computers, speech recognition has progressed very little over the past fifteen years. And yet, fifteen years from now, the bulk of our interaction with computers will be through the spoken word. It is time to move on this interface backwater and correct the fact that computers are hearing impaired.

In my opinion, the primary reason for so few advances is perspective, not technology. People have been working on the wrong problems and hold misguided views about the voice channel. When I see speech recognition demonstrations or advertisements with people holding microphones to their mouths, I wonder: Have they really overlooked the fact that one of the major values of

Talking to Computers:
Time for a New Perspective

ration is crucial because speech has little value if the user is limited to talking from one noise-free place.

#### **Aural Text**

Oversight number two: Speech is more than words. Anyone who has a child or a pet knows that what is said can be as important as how it is said. In fact, dogs respond to tone of voice more than any innate ability to do complex lexical analysis. I frequently ask people how many words they think their dogs know and I have received answers as high as 500 to 1,000. I suspect the number is closer to 20 or 30.

Spoken words carry a vast amount of information beyond the words themselves, which is something that my friends in speech recognition seem to A common assumption has been that we must be far out on all three of these axes for speech recognition to be at all useful. I do not agree.

One might ask, when it comes to vocabulary size, how big is big enough: 500, 5,000, or 50,000 words? The question is wrong. It should be: How many recognizable words need to be in the computer's memory at any one time? This question suggests subsetting vocabularies, such that chunks can be folded into the machine as needed. When I ask my computer to place a phone call, my Rolodex is loaded. When I am planning a trip, the names of places are there instead. If one views vocabulary size as the set of words needed at any one time, then the computer needs to select from a far less daunting number of words; closer to 500 than to the superset of 50,000.

Looking at speaker independence: Is this really so important? I believe it is not. In fact, I think I would be more comfortable if my computer were trained to understand my spoken commands and maybe only mine. The presumed need for speaker independence is derived in large part from earlier days, when the phone company wanted anybody to be able to talk to a remote database. The central computer needed to be able to understand anybody, a kind of "universal service." Today, we can do the recognition in the handset, so to speak. What if I want to talk with an airline's computer from a telephone booth? I call my computer or take it out of my pocket and let it do the translation from voice to ASCII. Once again, we can do a great deal at the "easier" end of this axis.

Finally, connectedness. Surely we do not want to talk to a computer like a tourist addressing a foreign child, mouthing each word as if in a locution class. Agreed. And this axis is the most challenging in my mind. But even here, there is a way out in the short term: Look at vocabulary as multiword utterances, not as just single words. These utterances can be short, slurred phrases of all kinds, which endow the machine with sufficient connected speech recognition to be very useful. In fact, handling runtogetherspeech in this fashion may well be part of the personalization and training of my computer.

My purpose is not to argue any one of these three points to death, but to show more generally that one can work much closer to the easiest corner of speech space than has been assumed and that the hard and important problems are elsewhere. Said in another way: It is time to look at talking from a different perspective.

Next: Talking WITH Computers

I want to have a computer be in "earshot."

But this requires an aspect of speech input that has been almost totally ignored:

Sound separation and capture.



speech is that it leaves your hands free? When I see people with their faces poked into the screen – talking – I wonder: Have they forgotten that the ability to function from a distance is a reason to use voice? In short, most people developing speech systems need a lesson in communications interfaces.

# **Speech Goes Around Corners**

Using computers today is so overt that the activity demands absolute and full attention. Usually, you must be seated. Then you must attend, more or less exclusively, to both the process and content of the interaction. There is almost no way to use a computer in passing or to have it be one of several conversations. This is oversight number one.

Computing at and beyond arm's length is very important. Imagine if talking to a person required that his or her nose always be in your face. We commonly talk to people at a distance, we momentarily turn away and do something else, and it is not uncommon to be out of sight while still talking.

That is what I want to be able to do with a computer: have it be in "earshot." But this requires an aspect of speech input that has been almost totally ignored: sound separation and capture. It is not trivial to segregate speech from the sounds of the air conditioner or an airplane overhead. But such sepa-

ignore. While talking one can convey passion, sarcasm, exasperation, equivocation, subservience, exhaustion, (and so on) with the exact same words. In speech recognition, these subcarriers of information are ignored or, worse, treated as bugs rather than features. They are, however, the very features that make speaking a richer medium than typing.

# The Three Dimensions of Speech

Speech recognition can be viewed as a problem defined by three axes: vocabulary size, degree of speaker independence, and the extent to which words can be slurred together (their connectedness). Think of this as a cube, whose lower left-hand near corner is a small vocabulary of totally speaker-dependent words, that must be uttered with distinct pauses between each. This is the simplest corner of the problem space.

As you move out along any axis, making the vocabulary larger, making the system work for any speaker, or allowing words to be run together, speech recognition gets harder and harder for the computer. In this regard, the upper right-hand far corner of this cube represents the most difficult place to be. Namely, this is where we expect the computer to recognize any word, spoken by anybody, "inneny" degree of connectedness.



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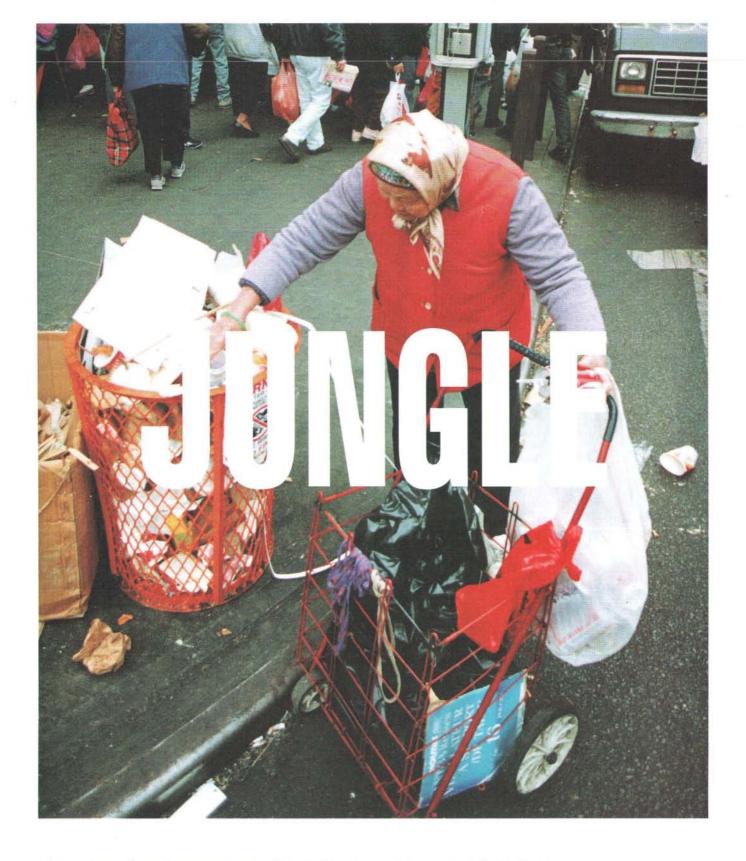


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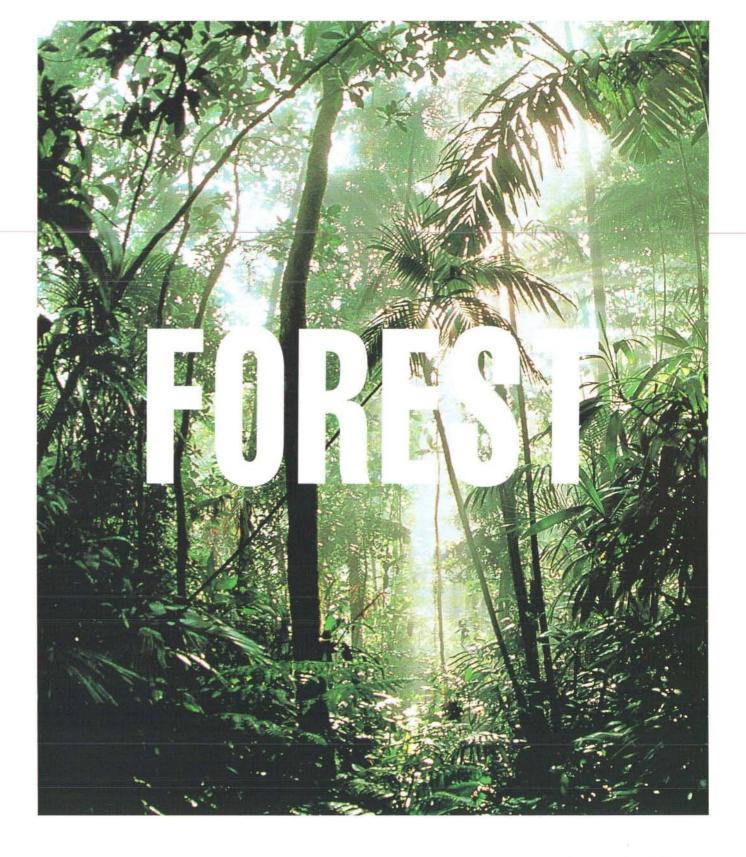


It is true that modern society possesses technological skills and powers which are beyond comparison... but are they still beyond doubt?

In terms of ways and means, almost anything goes. But looking at our social and cultural environment, aren't we rushing headlong down a track that might well turn out to be a blind alley, unless we are able to rethink what we call progress, to re-verify the quality of life, and to redefine our goals for the future?

This we could do, for example, by opening up within our dominant western society to other cultures, with other solutions for the balance between man and man as well as that between man and earth. Maybe that will help us to redefine our gains and losses.

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